OHIO RIVER BASIN
TRIBUTARY TO MONONGAHELA RIVER
FAYETTE COUNTY

PENNSYLVANIA

NDI No. PA 00295
PENN DER No. 26-105

LEVEL II

LABELLE SLURRY POND 3

JONES & LAUGHLIN STEEL CORPORATION
VESTA-SHANNOPIN COAL DIVISION

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

DACW31-81-C-0027

PREPARED FOR

DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT, CORPS OF ENGINEERS
BALTIMORE, MARYLAND 21203

BY

ACKENHEIL & ASSOCIATES GEO SYSTEMS, INC.
CONSULTING ENGINEERS
1000 BANKSVILLE ROAD
PITTSBURGH, PENNSYLVANIA 15216

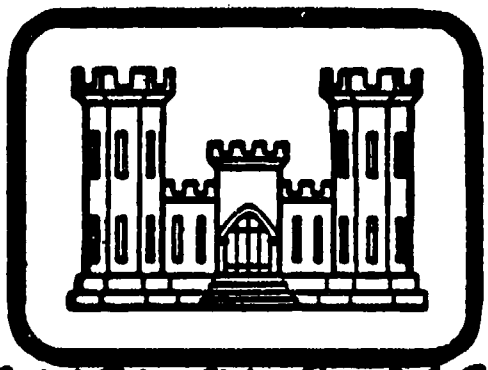
JULY 1981

OHIO RIVER BASIN

LABELLE SLURRY POND 3
FAYETTE COUNTY, COMMONWEALTH OF PENNSYLVANIA
NDI NO. PA 00295
PennDER NO. 26-105

JONES AND LAUGHLIN STEEL CORPORATION
VESTA-SHANNOPIN COAL DIVISION

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM



DACW31-81-C-0027

Prepared for: DEPARTMENT OF THE ARMY
Baltimore District, Corps of Engineers
Baltimore, Maryland 21203

Prepared by: ACKENHEIL & ASSOCIATES GEO SYSTEMS, INC.
Consulting Engineers
1000 Banksville Road
Pittsburgh, Pennsylvania 15216

Date: July 1981

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams for Phase I investigations. Copies of these guidelines may be obtained from the Department of the Army, Office of Chief of Engineers, Washington, D.C. 20314.

The purpose of a Phase I investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon visual observations and review of available data. Detailed investigations and analyses involving topographic mapping, subsurface investigations, materials testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the investigation is intended to identify the need for such studies which should be performed by the owner.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of the dam depends on numerous and constantly changing internal and external factors which are evolutionaly in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some time in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I investigations are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the spillway design flood is based on the estimated "Probable Maximum Flood" (PMF) for the region (greatest reasonably possible storm runoff), or fractions thereof. The spillway design flood provides a measure of relative spillway capacity and serves as an aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition, and the downstream damage potential.

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

SYNOPSIS OF ASSESSMENT AND RECOMMENDATIONS

NAME OF DAM:	LaBelle Slurry Pond 3
STATE LOCATION:	Pennsylvania
COUNTY LOCATION:	Fayette
STREAM:	Unnamed tributary to the Monongahela River
DATE OF INSPECTIONS:	14 May 1981 and 3 June 1981
COORDINATES:	Lat. 39° 59' 55" Long. 79° 58' 21"

ASSESSMENT

Based on a review of available information, visual observations of conditions as they existed on the date of the field inspections, and supporting engineering calculations, the general condition of LaBelle Slurry Pond 3 is considered to be fair.

This assessment is based primarily on visual observations of embankment and spillway conditions and hydrology/hydraulic analyses of reservoir/spillway capacity.

The structure is classified as a "large" size, "significant" hazard dam. Corps of Engineers guidelines recommend the Probable Maximum Flood (PMF) as the Spillway Design Flood for a "large" size, "significant" hazard dam. LaBelle Slurry Pond 3's Spillway Design Flood is the Probable Maximum Flood. Spillway capacity is "inadequate" because the non-overtopping flood discharge was found, by using the HEC-1 computer program, to be 79 percent of the PMF.

The Phase I investigation of LaBelle Slurry Pond 3 revealed deficiencies and conditions which should be corrected or improved through implementation of the following recommended improvement efforts.

RECOMMENDATIONS are

(1) Embankment Improvements: The owner should continue to implement the existing abandonment plan with all possible speed. In particular, the deeper erosional gullies on the downstream face should be eliminated by collecting spring flows in underdrains and then backfilling the cavity with compacted coarse coal refuse.

Concurrently, surface drainage courses should be defined and improved to reduce erosion in the large existing gullies.

next page

SYNOPSIS OF ASSESSMENT AND RECOMMENDATIONS (CONT'D)
LaBelle Slurry Pond 3

(2) Principal Spillway: The owner should immediately clean the principal spillway trash cage of debris and improve the inflow channel to permit unrestricted flow from the reservoir to the pipe. The trash cage should be periodically inspected (weekly or monthly) and cleaned as required to maintain the reservior water level at its design elevation.

(3) Emergency Spillway: The emergency spillway should either be improved or eliminated. Improvements should be sufficient to prevent erosion of the downstream slope by spillway discharges.

(4) Emergency Operation and Warning Plan: The owner should develop an Emergency Operation and Warning Plan including:

(1) Guidelines for evaluating inflow during periods of heavy precipitation or runoff.

(2) Procedures for around-the-clock surveillance during periods of heavy precipitation or runoff.

(3) Procedures for drawdown of the reservoir under emergency conditions.

(4) Procedures for notifying downstream residents and public officials, in case evacuation of downstream areas is necessary.

(5) Monitoring of Seepage Zones: The seepage zones and springs on and about the downstream toe of the embankment should be monitored for changes in water quality and quantity. If one does not now exist, the owner should develop and implement a regularly scheduled monitoring program with appropriate records to indicate possible long-term changes in seepage conditions.

(6) Maintenance and Inspection Procedures: The owner should develop written maintenance and inspection procedures in the form of checklists and step-by-step instructions.

SYNOPSIS OF ASSESSMENT AND RECOMMENDATIONS (CONT'D)

LaBelle Slurry Pond 3

Samuel G. Mazzella 17 July 1981

Samuel G. Mazzella — Date
Project Engineer

James P. Hannan 17 July 1981

James P. Hannan — Date
Project Engineer

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL ENGINEER
James Ellsworth Barrick, II
No. 22639-E

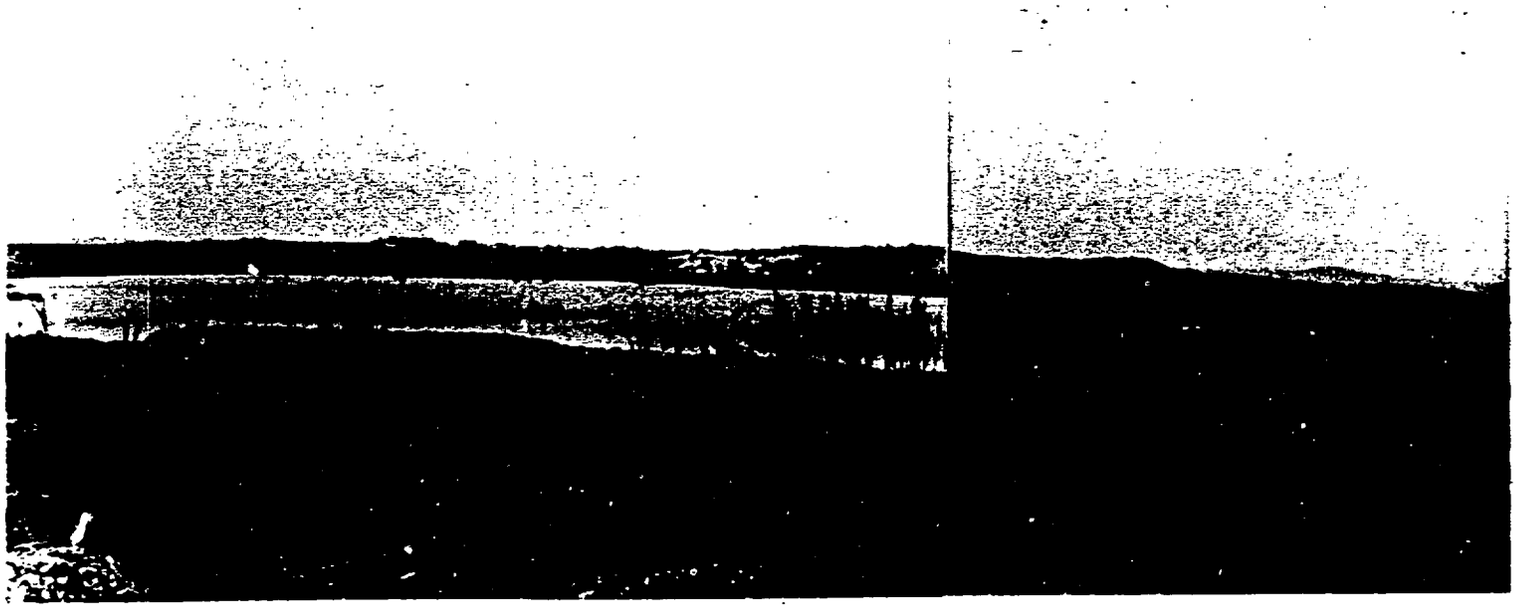
James E. Barrick 17 July 1981

James E. Barrick, II, P.E. — Date
PA Registration No. 022639-E

Approved by: 11 Aug 81

JAMES W. PECK — Date
Colonel, Corps of Engineers
Commander and District Engineer

LABELLE SLURRY POND 3



OVERVIEW

TABLE OF CONTENTS

	Page
PREFACE	i
SYNOPSIS OF ASSESSMENT AND RECOMMENDATIONS	ii
OVERVIEW PHOTOGRAPH	v
SECTION 1 - PROJECT INFORMATION	
1.1 General	1
1.2 Description of Project	1
1.3 Pertinent Data	3
SECTION 2 - ENGINEERING DATA	
2.1 Design	5
2.2 Construction	5
2.3 Operation	6
2.4 Evaluation	6
SECTION 3 - VISUAL INSPECTION	
3.1 Findings	7
3.2 Evaluation	11
SECTION 4 - OPERATIONAL FEATURES	
4.1 Procedure	12
4.2 Maintenance of Dam	12
4.3 Inspection of Dam	12
4.4 Warning Procedure	12
4.5 Evaluation	12
SECTION 5 - HYDROLOGY AND HYDRAULICS	
5.1 Evaluation of Features	13
SACTION 6 - STRUCTURAL STABILITY	
6.1 Available Information	15
6.2 Evaluation	16
SECTION 7 - ASSESSMENT AND RECOMMENDATIONS	
7.1 Assessment	17
7.2 Recommendations	18

TABLE OF CONTENTS (cont'd)

		Page
APPENDIX A -	VISUAL INSPECTION CHECKLIST	
	Visual Observations Checklist I	A1
	Field Sketch	A10
	Field Profile	A11
	Field Section	A12
APPENDIX B -	ENGINEERING DATA CHECKLIST	
APPENDIX C -	PHOTOGRAPHS	
	Photo Key Map	C1
	Photos 1 through 28	C2
	Photo Descriptions	C9
APPENDIX D -	HYDROLOGY AND HYDRAULICS ANALYSES	
	Methodology	D1
	Engineering Data	D3
	HEC-1 Data Base	D4
	Loss Rate and Base Flow Parameters . . .	D5
	Elevation-Area-Capacity Relationships .	D5
	Overtop Parameters	D6
	Program Schedule	D7
	HEC-1 Computer Analysis	D8
	Hydrologic Performance Plot	D11
APPENDIX E -	PLATES	
	List of Plates	E1
	Plates I through VII	
APPENDIX F -	GEOLOGY	
	Geomorphology	F1
	Structure	F1
	Stratigraphy	F1
	Mining Activity	F1
	Geologic Map	F2
	Geologic Column	F3

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM
LABELLE SLURRY POND 3
NATIONAL I. D. NO. PA 00295
PennDER No. 26-105

SECTION 1
PROJECT INFORMATION

1.1 GENERAL

a. Authority: The Phase I investigation was performed pursuant to authority granted by Public Law 92-367 (National Dam Inspection Act) to the Secretary of the Army, through the Corps of Engineers, to conduct inspections of dams throughout the United States.

b. Purpose: The purpose of the investigation is to make a determination on whether or not the dam constitutes a hazard to human life or property.

1.2 DESCRIPTION OF PROJECT

a. Dam and Appurtenances:

(1) Embankment: LaBelle Slurry Pond 3 was constructed as a randomly dumped coarse coal refuse bank. The impounding portion of the embankment is 1,060 feet long and has a maximum height of about 200 feet and a crest width that varies from 250 to 360 feet. The embankment's upstream slope was measured to be 0.5H:1V above the waterline. The downstream slope is approximately 2.8H:1V overall from crest to toe. Locally, very steep slopes exist.

(2) Principal Spillway: The principal spillway is a 12 inch diameter pipe with steel screen trash cage at the south end of the pond.

(3) Emergency Spillway: The emergency spillway is a 48 inch diameter asphalt coated corrugated metal pipe embedded in the impounding embankment near the left abutment.

(4) Outlet Works: There were no facilities observed that would drain the impoundment in the event of an emergency.

(5) Freeboard Conditions: Freeboard between the pool elevation at the time of the inspection and the crest of the embankment was measured to be 6.6 feet.

(6) Downstream Conditions: Discharge flows from LaBelle Slurry Pond 3 pass through a narrow valley below the downstream toe. Smaller flows will enter an incised sedimentation pond 1,500 below. Larger flows will breach the drainage channel and enter a steep-sided, wooded valley below. One inhabited dwelling, a highway, a rail yard and the U.S. Corps of Engineers' Maxwell Lock and Dam on the Monongahela River lie on the flood plain in the first 3,000 feet below LaBelle Slurry Pond 3.

(7) Reservoir: The LaBelle Slurry Pond 3 reservoir was about 1200 feet long at the time of the inspection. When the pool is at the dam's crest, the reservoir length increases to 1,400 feet.

(8) Watershed: The watershed contributing to LaBelle Slurry Pond 3, 96 acres, consists mostly of unvegetated coal refuse.

b. Location: LaBelle Slurry Pond 3 is located off Meadow Run in Luzerne Township, Fayette County, Pennsylvania, approximately one mile southeast of LaBelle, Pennsylvania.

c. Size Classification: The reservoir has a maximum storage capacity of 318 acre-feet and the dam has a toe to crest height of 200 feet. Based on the Corps of Engineers guidelines, LaBelle Slurry Pond 3 is a "large" size structure.

d. Hazard Classification: LaBelle Slurry Pond 3 is classified as a "significant" hazard dam. In the event of a dam failure, one major local highway (Legislative Route 977), one inhabited dwelling, a rail yard and the Corps of Engineers' Maxwell Lock and Dam would be at elevations low enough to possibly be subjected to substantial damage and loss of a few lives could result.

e. Ownership: LaBelle Slurry Pond 3 is owned by the Jones and Laughlin Steel Corporation, McMurray, Pennsylvania. Inquiries concerning the dam should be addressed to:

Jones and Laughlin Steel Corporation
420 South Washington Road
McMurray, PA 15317
Attention: Mr. K. V. Rao, Chief Engineer
(412) 941-3400

f. Purpose of Dam: The LaBelle Slurry Pond 3 was constructed as a storage facility for fine coal refuse produced at the LaBelle Coal Preparation Plant.

g. Design and Construction History: Pond 3 was constructed of coarse coal refuse by Jones and Laughlin Steel Corporation personnel. Fine coal refuse was first impounded in 1958.

h. Normal Operating Procedure: No fine coal refuse has been placed in Pond 3 since 1975. The owner is currently in the early stages of reshaping the refuse area and filling in Pond 3. Pool level is now maintained by the principal spillway trash cage.

1.3 PERTINENT DATA

a. Drainage Area	0.15 sq. mi.
b. Discharge at Dam Facility	
Maximum Flood at Dam Facility	Unknown
Emergency Spillway Capacity at Top of Embankment	Negligible
Principal Spillway Capacity at Top of Embankment	Negligible
c. Elevation (feet above MSL)	
Design Top of Embankment	Unknown
Current Top of Embankment (low point)	1100.4
Emergency Spillway Invert	1094.9
Pool at Date of Inspection	1093.8
Principal Spillway Inlet Invert*	1092.0
Maximum Tailwater	Unknown
Downstream Toe of Embankment	900±
d. Reservoir Length	
Maximum Pool	1,400 feet
Pool at Emergency Spillway Inlet	1,300 feet
Pool at Time of Inspection	1,200 feet
Pool at Principal Spillway Inlet	1,100 feet
e. Reservoir Storage	
Current Top of Embankment	318 acre-feet
Emergency Spillway Inlet	179 acre-feet
Principal Spillway Inlet	114 acre-feet

*Datum for field measurements as per discussion with owner's representatives.

f. Reservoir Surface

Current Top of Embankment	26.5 acres
Emergency Spillway Inlet	22.3 acres
Principal Spillway Inlet	21.1 acres

g. Embankment

Type	Coarse Coal Refuse
Length	1,060 feet
Height	200 feet
Crest Width	Varies from 250 to 360 feet
Slopes	
Downstream (Overall)	2.8H:1V
Upstream	0.5H:1V
Impervious Core	Unknown
Grout Curtain	Unknown

h. Principal Spillway

Type	Steel Pipe Conduit
Location	South Side of Impoundment
Diameter	12 inches
Trash Cage	Yes
Valve/Control	No

i. Emergency Spillway

Type	Asphalt Coated Corrugated Metal Pipe Left End of Impounding Embankment
Diameter	48 inches
Trash Cage	No

j. Outlet Works

Type	None

SECTION 2
ENGINEERING DATA

2.1 DESIGN

a. Design History: There was no information available concerning the design history of this structure.

b. Data Available: The data available for review included:

(1) The contents of the Pennsylvania Department of Environmental Resources files consisting of dam location data and a National Dam Inventory Form.

(2) A set of ten engineering drawings entitled "LaBelle Coal Refuse Disposal Facility, Operation and Abandonment Plan ...", provided by the owner.

(3) Conversations with the Owner's Representatives during the field inspections on 14 May 1981 and 3 June 1981.

2.2 CONSTRUCTION

a. Construction: The dam was constructed by Jones and Laughlin Steel Corporation using coarse coal refuse from the LaBelle Coal Preparation Plant. Placement procedures were not reported or documented. The impoundment was first used in 1958.

b. Modification: Current and future modifications to this facility are presented on the drawings referenced in 2.1.b(2) above. To date, the impoundment zone has been partially backfilled, the downstream drainage channels and sediment ponds have been constructed, and the subsurface drain has been installed.

In 1976, the 48 inch diameter CMP emergency spillway was installed by Jones & Laughlin personnel.

In 1975, the 12 inch diameter principal spillway conduit was installed by Jones & Laughlin personnel.

In 1975 and 1976, the embankment's downstream slope was buttressed at the right end and underdrains when installed. The embankment crest was widened by backfilling over the impoundment zone. At this time, also, the fine coal refuse slurry line was moved from the rear of the reservoir to the crest of the embankment.

2.3 OPERATION

a. Dam: The dam was designed to operate without a dam tender and no operational data are available.

b. Principal Spillway: The principal spillway is a 12 inch diameter steel pipe located at the south end of the impoundment. The inlet is uncontrolled except by debris clogging of the trash cage.

c. Emergency Spillway: The emergency spillway is a 48 inch diameter asphalt coated, corrugated metal pipe located on the eastern side of the embankment. This inlet is uncontrolled.

d. Outlet Works: There is no permanent outlet works to drain the impoundment in case of an emergency.

2.4 EVALUATION

a. Availability: Available information was obtained from the Pennsylvania Department of Environmental Resources and the owner. The drawings mentioned in Appendix B were provided by the owner.

b. Adequacy: The available design information, supplemented by field inspections and supporting engineering analyses presented in succeeding sections and conversations with a representative of the owner, is adequate for the purposes of this Phase I Inspection Report.

c. Validity: There appears to be no reason to question the validity of the available information.

SECTION 3
VISUAL INSPECTION

3.1 FINDINGS

a. General: The field inspections of LaBelle Slurry Pond 3 were performed on 14 May 1981 and 3 June 1981 and consisted of:

(1) Visual observations of the embankment crest and slopes, groins and abutments;

(2) Visual observations of the principal and emergency spillways;

(3) Visual observations of the embankment's downstream toe area, including drainage channels and surficial conditions;

(4) Transit stadia field measurements of relative elevations along the embankment crest and across the embankment slopes;

(5) Visual observations of the reservoir shoreline and watershed;

(6) Visual observations of downstream conditions and evaluations of downstream hazard potential.

The visual observations and measurements were made during periods when the reservoir was at normal operating level.

Most of the visual observations and all of the measurements were made on 3 June 1981. Heavy rains were reported in the area the preceding day.

The visual observations checklist, field sketch, field profile and field section containing the observations and comments of the field inspection team are contained in Appendix A. Specific observations are illustrated on photographs in Appendix C. Detailed findings of the field inspection are presented in the following sections.

b. Dam Configuration: LaBelle Slurry Pond 3 is an extensive deposit of coarse coal refuse which has been placed across the valley of an unnamed tributary to the Monongahela River. Pipe culvert emergency and principal spillways are in use at the facility.

c. Embankment:

(1) Crest: The crest of the embankment is irregular, both horizontally and vertically. The crest rises sharply toward either end of the impounding embankment and attains its low point approximately 150 feet from the emergency spillway, which passes beneath the crest.

No cracks or significant discontinuities were observed on or along the crest that would indicate significant movement, settlement, or slope instability.

No significant depressions or low spots were observed that would impound surface runoff on or near the crest. Many small depressions exist, however.

In general, the crest is unvegetated and has suffered some erosion due to surface runoff. However, because of the great crest width, such erosional activity does not now constitute a threat to the impoundment.

(2) Upstream Slope: The upstream face of the embankment was generally irregular, both from crest to toe and abutment to abutment. The upstream face contained some erosional gullies that have resulted from surface runoff over unvegetated surfaces. The upstream slope was generally steep, but there were no indications of significant slope instability.

(3) Downstream Slope: The downstream face of the embankment consists of massive deposits of coarse coal refuse that have suffered significant erosional activity over the years since their deposition. Several deep erosional gullies were observed, which have resulted from both spring activity and surface runoff. Some surficial sloughing of steeper slopes was observed within the erosional gullies.

There were no indications of significant instability of the embankment's downstream slope. No large cracks, scarps, or anamolous bulges were observed anywhere on the downstream slope. The only vegetation observed consisted of a small stand of trees near the center of the crest and several swampy zones near the downstream toe that contained reeds and cattails.

(4) Seepage: Three well-defined springs and several other swamp zone sources of seepage were observed on the embankment's downstream slope. Visual estimates of seepage flows indicated that the strongest spring was discharging six to eight gallons per minute of clear water, and that the total flow from the embankment's downstream slope area was estimated to be 15 to 20 gallons per minute of clear water.

(5) Embankment Groins: The embankment groins consisted of irregular drainage channels at the immediate toe of the embankment on both the left and right sides. The channels were lined with vegetation ranging from grass to small trees, and were partially blocked at some locations by natural debris such as leaves, branches, and small downtimber.

The left abutment contained a significant flow of water which appeared to be originating at a swampy zone at the toe of the upper left end of the impounding embankment. In the lower reach, the channel lies in a deep erosional cut through coarse coal refuse materials that have been deposited by surface runoff flows from the embankment. Channel slopes in the cut ranged from vertical to very steep, and some surficial sloughing was observed. The estimated channel flow in this reach was 8 to 12 gallons per minute.

The right abutment groin contained a flow of less than 1/2 gallon per minute, which appeared to emanate from a spring at the base of a deep erosional gully in the right central portion of the embankment.

d. Abutments: The abutments of the impounding embankment were generally mild-sloped and wooded. There were no signs of erosion or instability of either abutment slope.

e. Principal Spillway: The principal spillway conduit is protected by a wire mesh trash cage which is 3 feet high and 3 feet by 5 feet in plan. On the date of inspection, the trash cage was clogged with silt, debris, and vegetal matter to a depth of approximately 2.5 feet. The inlet to the pipe did not appear to be blocked otherwise.

The principal spillway outlet location and structure were not observed during the field investigation. However, there was no indication of back-up or back water at the inlet to the pipe.

f. Emergency Spillway: The emergency spillway conduit passes through the dam at the left center of the impounding embankment. The pipe is located just beneath the crest of the dam, and discharges directly to the downstream slope. On the date of inspection, the inlet to the pipe was partially blocked by a conical pile of coal refuse, and a severe erosional gully was observed below the pipe's outlet. No significant obstructions were observed within the pipe.

The owner's representative indicated that the emergency spillway has never operated, and that the erosional gully below the pipe's outlet is the result of normal surface runoff.

g. Reservoir:

(1) Slopes: The slopes above the pond waterline were generally steep to very steep coarse coal refuse materials, and were completely unvegetated on the date of inspection. Considerable erosion has occurred on these slopes, and a considerable amount of sediment has been deposited at and just above the pool shoreline.

(2) Inlet Stream: The LaBelle Slurry Pond 3 has no defined inlet stream.

(3) Watershed: The watershed of Pond 3 is contained within the limits of the LaBelle Coal Refuse Disposal Area, and consists entirely of unvegetated coarse coal refuse surfaces adjacent to the perimeter of the pond.

(4) Sedimentation: Pond 3 is an inactive disposal facility for fine coal refuse wastes from the LaBelle Coal Preparation Plant below. According to the owner's representative, the pond is almost completely filled with fine coal refuse. The pond has not been in use since 1975. No sounding information was available to indicate the depth of standing water in the pond.

h. Downstream Conditions:

(1) Downstream Channels: Two downstream channels lead from the embankment's toe area to two sedimentation ponds which are located approximately between 1,000 and 1,500 feet below the toe of the embankment. Both ponds are incised into original ground, and appeared to be in very good condition on the date of inspection.

Discharges from the emergency spillway, if such were to occur, would be onto the embankment's downstream slope, to the downstream toe area, and into the drainage channel to the lower of the two sedimentation ponds. Flow below the lower sedimentation pond would be onto a wooded hillside below.

Major flows in the downstream toe area would probably breach the drainage channel and enter a natural, heavily wooded drainage swale below the toe of the dam.

The downstream channel for the principal spillway was not observed, but the owner's representative indicated that the principal spillway conduit discharges directly to Meadow Run and to the Monongahela River through an uninhabited valley.

(2) Floodplain Development: In the first 3,000 feet below Pond 3, one major local highway, one inhabited dwelling, a rail yard, and a Corps of Engineer's lock and dam lie at elevations low enough to possibly be imperiled by high flows.

3.2 EVALUATION

The following evaluations are based on the visual inspections performed on 3 June 1981.

a. Embankment: The significant conditions observed at LaBelle Slurry Pond 3 included:

(1) Considerable and sometimes significant erosion of the embankment's downstream slopes.

(2) Lack of vegetal covering that promotes the continued significant erosion of the embankment.

(3) No indication of embankment instability and no indication of a general high water level within the embankment.

(4) Numerous wet swampy zones located on and adjacent to the embankment's downstream toe.

(5) Several seeps and springs associated with deep erosional gullies.

(6) No indication, based on water clarity and sedimentation zones, that active internal erosion (piping) of the embankment is occurring.

(7) Sloughing of steep slopes, primarily in the deep erosional gullies.

b. Principal Spillway: The condition of the principal spillway is considered to be fair. This is based on an observed build-up of silt and debris around the perimeter of the trash cage.

c. Emergency Spillway: The condition of the emergency spillway is considered to be poor. This is based primarily on the observed pipe's alignment that directs emergency spillway flows onto the embankment's downstream slope.

Under normal circumstances, the deposit of coal refuse materials blocking the inlet would be considered a deficiency. In this case; however, it is considered to be beneficial, in that it restricts emergency spillway flows to elevations higher than the inlet of the pipe.

d. Hazard Potential: The LaBelle Slurry Pond 3 was assigned a "significant" hazard potential rating. This rating was based on the observed height and limited impounding capacity of the embankment and downstream conditions that included one inhabited dwelling, an important local highway, a railyard, and a Corps of Engineers lock and dam.

SECTION 4
OPERATIONAL FEATURES

4.1 PROCEDURE

Reservoir pool level is supposed to be maintained by the inlet invert of the principal spillway. On the date of inspection, debris on the trash cage was controlling the reservoir pool level. Normal operating procedure does not require a dam tender. There are no operation facilities at the dam.

The emergency spillway is uncontrolled.

No outlet works for the reservoir was observed.

4.2 MAINTENANCE OF DAM

The embankment and appurtenances are not maintained.

4.3 INSPECTION OF DAM

The Jones and Laughlin Steel Corporation is required by the State of Pennsylvania to inspect the dam annually and make needed repairs.

The Jones and Laughlin Steel Corporation is required by the Mine Health and Safety Administration (MSHA) to inspect the dam at least once every seven days and to make an annual report and certification of the dam.

4.4 WARNING PROCEDURE

There is no warning system and no formal emergency procedure to alert or evacuate downstream residents upon threat of a dam failure.

4.5 EVALUATION

The lack of a facility or plan to drain the reservoir is considered to be a deficiency. The lack of a warning system/ emergency plan is considered a deficiency. The recommendations presented in Section 7 should be implemented as part of a general abandonment, closure and reclamation plan.

SECTION 5
HYDROLOGY/HYDRAULICS

5.1 EVALUATION OF FEATURES

a. Design Data: LaBelle Slurry Pond 3 has a watershed of 96 acres which is unvegetated coarse coal refuse. The watershed is about 2,900 feet long and 2,200 feet wide and has a maximum elevation of about 1,160 feet (MSL).

There is no information available concerning the principal or emergency spillway design, and there is no information available on the required spillway capacity at the time of this facility's construction.

No other hydrologic calculations were found relating reservoir/spillway performance to the Probable Maximum Flood or fractions thereof.

b. Experience Data: Records are not kept of reservoir level or rainfall amounts. There is no record or report of the embankment ever being overtopped.

c. Visual Observations: On the date of the field inspection, the pool elevation was about 6.6 feet below the crest of the dam.

The principal spillway was operating. However, its trash rack was clogged by debris to a depth of two feet. The 48 inch diameter emergency spillway was partially blocked at its upstream end by coarse coal refuse.

d. Overtopping Potential: Overtopping potential was investigated through the development of the Probable Maximum Flood (PMF) for the watershed and the subsequent routing of the PMF and fractions of the PMF through the reservoir. The Corps of Engineers guidelines recommend the Probable Maximum Flood (PMF) for "large" size, "significant" hazard dams. Based on the size and hazard classification, LaBelle Slurry Pond 3 has a Spillway Design Flood (SDF) of the PMF.

Hydrometeorological Report No. 33 indicates the adjusted 24 hour Probable Maximum Precipitation (PMP) for the subject site is 19.3 inches. No calculations are available to indicate whether the reservoir is sized to store a flood corresponding to the runoff from 19.3 inches of rainfall in 24 hours. Consequently, an evaluation of the reservoir was performed to determine whether the dam's available storage capacity is adequate under current Corps of Engineers guidelines.

The Corps of Engineers, Baltimore District, has directed that the HEC-1 Dam Safety Version computer program be utilized. The program was prepared by the Hydrologic Engineering Center (HEC), U.S. Army Corps of Engineers, Davis, California, July 1978. The major methodologies and key input data for this program are discussed briefly in Appendix D.

The peak inflow to LaBelle Slurry Pond 3 was determined by HEC-1 to be 600 cfs for a full PMF.

The reservoir routing was performed assuming that the initial pool elevation was 1095.0. This elevation was used because of the observed condition of the principal spillway inlet and the potential for blockage to Elevation 1095.0.

The discharge capacity of the principal spillway was not used in the analysis because of it's negligible effect on routing conditions.

The discharge capacity of the emergency spillway was not used because of the observed partial blockage at the conduit inlet. The unblocked capacity of the emergency spillway may have a definite effect on reservoir pool level during routing of the SDF. However, discharge from the emergency spillway should not be permitted until outlet conditions have been improved.

e. Adequacy: The capacity of the reservoir (with spillways blocked) was determined to be 79% of the PMF (SDF) by HEC-1. According to Corps of Engineers' Guidelines, LaBelle Slurry Pond 3's spillway capacity is "inadequate."

SECTION 6
STRUCTURAL STABILITY

6.1 AVAILABLE INFORMATION

a. Design and Construction Data: No design documentation or calculations were available for review. The owner provided the modification drawings that are cited in Appendix B and presented in Appendix E.

b. Operating Records: There are no written operating records or procedures for this dam.

c. Mining Activity: The Pittsburgh Coal Seam lies approximately 300 feet below the dam and impoundment and reportedly has been deep mined in the site vicinity.

d. Visual Observations:

(1) Embankment: The field inspection disclosed no evidence of a high groundwater level in the embankment.

Several swampy zones were observed near the downstream toe that were emitting iron laden water and had considerable swamp related vegetation.

Several springs were observed at the bases of some of the deeper erosional gullies on the downstream slope. The estimated spring elevations did not suggest a high embankment water level.

Local slopes on the downstream face are very steep, particularly within the limits of the deeper erosional gullies. The overall downstream slope is moderate, being approximately 2.8H:1V as shown on Section B-B (Plate VII). The section location appears to be approximately through the steepest part of the embankment. Slope segments on Section B-B are as steep as 1.8H:1V.

No significant cracks, scarps or anomalous bulges were observed on the downstream slope, although sloughing of locally steep slopes has occurred at several places.

(2) Principal Spillway: The condition of the principal spillway structure could not be determined but on the date of the inspection, the spillway was functional.

(3) Emergency Spillway: No structural deficiencies of the emergency spillway were observed. The location of the conduit outlet provides for potential significant erosion of the impounding embankment's downstream slope.

(4) Evidence of Mine Subsidence: None.

e. Performance: No information was available on performance of LaBelle Slurry Pond 3 since its construction in 1958.

6.2 EVALUATION

a. Design Documents: No design documentation was available to evaluate the structure.

b. Embankment: Based on the results of the visual observations of embankment slopes, materials and seepage conditions, LaBelle Slurry Pond 3 impounding embankment appears to be stable with respect to major slope movement. Minor sloughing has and will continue to occur until locally steep slopes have been eliminated. Continued local sloughing could lead to more serious embankment stability problems if allowed to continue indefinitely.

c. Principal Spillway: The principal spillway was functional on the date of inspection.

d. Emergency Spillway: The emergency spillway was structurally stable on the date of inspection. The conduit alignment is considered to be seriously deficient with respect to potential erosional instability of the downstream slope.

e. Seismic Stability: According to the Seismic Risk Map of the United States, LaBelle Slurry Pond 3 is located in Zone 1 where damage due to earthquakes would most likely be minor.

A dam located in Seismic Zone 1 may be assumed to present no hazard from an earthquake provided static stability conditions are satisfactory and conventional safety margins exist. No calculations were developed to verify this assessment, however.

SECTION 7
ASSESSMENT AND RECOMMENDATIONS

7.1 ASSESSMENT

a. Evaluation:

(1) Embankment: LaBelle Slurry Pond 3's impounding embankment is considered to be in fair condition. This assessment is based on visual observations of significant erosional distress and uncontrolled seepage on the downstream slope.

The erosion and surface conditions are mitigated by a very wide embankment crest and no indication of a high groundwater level in the embankment.

(2) Principal Spillway: The condition of the principal spillway is considered to be poor. This assessment is based on visual observations of significant clogging of the trash cage and an "inadequate" capacity rating according to the HEC-1 analysis.

(3) Emergency Spillway: The condition of the emergency spillway is considered to be poor. This assessment is based on observations that indicate a potential for serious erosion of the embankment's downstream slope by spillway discharges.

(4) Emergency Plans: The lack of a documented emergency operation and warning plan is considered to be a deficiency. Also, the lack of a facility or plan to draw down the reservoir water level under emergency conditions is considered to be a deficiency.

b. Adequacy of Information: The information available on design, construction, operation and performance history in combination with visual observations and hydrology and hydraulic calculations was sufficient to evaluate the embankment and appurtenant structures in accordance with the Phase I investigations guidelines.

c. Urgency: The recommendations presented in Section 7 should be implemented immediately.

d. Necessity for Further Studies: None.

7.2 RECOMMENDATIONS

a. Embankment Improvements: The owner should continue to implement the existing abandonment plan with all possible speed. In particular, the deeper erosional gullies on the downstream face should be eliminated by collecting spring flows in underdrains and then backfilling the cavity with compacted coarse coal refuse.

Concurrently, surface drainage courses should be defined and improved to reduce erosion in the larger existing gullies.

b. Principal Spillway: The owner should immediately clean the principal spillway trash cage of debris and improve the inflow channel to permit unrestricted flow from the reservoir to the pipe. The trash cage should be periodically inspected (weekly or monthly) and cleaned as required to maintain the reservoir water level at its design elevation.

c. Emergency Spillway: The emergency spillway should either be improved or eliminated. Improvements should be sufficient to prevent erosion of the downstream slope by spillway discharges.

d. Emergency Operation and Warning Plan: The owner should develop an Emergency Operation and Warning Plan including:

(1) Guidelines for evaluating inflow during periods of heavy precipitation or runoff.

(2) Procedures for around-the-clock surveillance during periods of heavy precipitation or runoff.

(3) Procedures for drawdown of the reservoir under emergency conditions.

(4) Procedures for notifying downstream residents and public officials, in case evacuation of downstream areas is necessary.

e. Monitoring of Seepage Zones: The seepage zones and springs on and about the downstream toe of the embankment should be monitored for changes in water quality and quantity. If one does not now exist, the owner should develop and implement a regularly scheduled monitoring program with appropriate records to indicate possible long-term changes in seepage conditions.

f. Maintenance and Inspection Procedures: The owner should develop written maintenance and inspection procedures in the form of checklists and step-by-step instructions.

APPENDIX A

VISUAL INSPECTION CHECKLIST

VISUAL OBSERVATIONS CHECKLIST I
(NON-MASONRY IMPOUNDING STRUCTURE)

Name of Dam LaBelle Slurry Pond 3 County Fayette State Pennsylvania National ID # PA 00295

Type of Dam Coarse Coal Refuse Hazard Category Significant

Dates of Inspection	Weather	Temperature
14 May 1981	Partly cloudy, warm	70°F
3 June 1981	Cloudy, warm, light rain	65°F

Pool Elevation at Time of Inspection 1093.8 (MSL)

Inspection Personnel:

14 May 1981

J. E. Barrick, P.E.	Ackenheil & Associates, Project Manager and Hydrologist
J. P. Hannan	Ackenheil & Associates, Geotechnical Engineer
S. G. Mazzella	Ackenheil & Associates, Civil Engineer
K. V. Rao	Jones & Laughlin Steel Corporation, Owner's Representative
D. Wright	Jones & Laughlin Steel Corporation, Owner's Representative

3 June 1981

J. E. Barrick, P.E.	Ackenheil & Associates, Project Manager and Hydrologist
J. P. Hannan	Ackenheil & Associates, Geotechnical Engineer
S. G. Mazzella	Ackenheil & Associates, Civil Engineer
D. Wright	Jones & Laughlin Steel Corporation, Owner's Representative

Recorder J. E. Barrick

GEO Project G80138-A
PennDER I.D. No. 26-105

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS	Randomly oriented drying cracks observed. Cracks ranged from closed to very slight opening. Numerous sharp, deep erosional gullies observed on embankment's downstream slope.	
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	None observed.	
SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES	Significant erosion of embankment slopes both upstream and downstream observed over entire embankment. Some erosional gullies are very deep and contain surficial sloughing of very steep gully slopes. No significant sloughing or erosion of abutment slopes was observed.	
VERTICAL AND HORIZONTAL ALIGNMENT OF THE CREST	The embankment crest was quite irregular in both the horizontal and vertical planes. In general, the crest rose sharply toward either end of the dam, and was generally flat over the central portion. Horizontally, the embankment crest is convex in the downstream direction, and contains significant variations in crest width. The minimum observed crest width was approximately 250 ft.	

EMBANKMENT (CONTINUED)

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
RIPRAP FAILURES	None observed.	
SETTLEMENT	Settlement of the crest and slopes could not be evaluated because of the natural irregularity of the surfaces.	
JUNCTION OF EMBANKMENT AND ABUTMENT	The junction of the embankment and the left abutment contains a small drainage channel that is generally irregular, rock and debris lined, and is surrounded by vegetation ranging from grass to small trees. In the lower reach, near the deepest section of the embankment, the channel has eroded deeply into coarse coal refuse materials that have been placed by sedimentation immediately below the toe of the embankment. Slopes within this reach are very steep and recent sloughing has occurred. The junction of the embankment and the right abutment is similar in nature to the junction of the embankment and the left abutment. The drainage channel in the groin within this reach, however, appears to be more stable, as it contains significantly smaller flows. Both abutments were generally mild in slope, and tree-covered on the date of inspection.	
ANY NOTICEABLE SEEPAGE	Numerous swampy areas and several well-defined springs were observed on and immediately below the embankment. In general, the springs and swampy zones contained considerable iron staining, but there were no indications of the internal erosion of embankment or foundation materials.	

EMBANKMENT (CONTINUED)

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
	Several visual flow estimates were made during the field inspection, and are recorded by location, flow, and source on the field sketch, page A-10. The total estimated flow, below the toe of the embankment, was 15-20 gallons per minute.	
STAFF GAUGE AND RECORDER	None observed.	
DRAINS	The owner's representative indicated that a subsurface toe drain had recently been constructed immediately beneath the access road that parallels the downstream toe of the embankment. The outlet end of the drain was not observed during the inspection.	
SURFICIAL CONDITIONS	The embankment crest was unvegetated and generally irregular, consisting of coarse coal refuse deposits. No significant depressions were observed that might impound surface water, and surface drainage was generally uncontrolled. The embankment's upstream slope consists of randomly deposited coarse coal refuse. The upstream slope is unvegetated and has suffered some erosion of the slopes with subsequent sedimentation at the toe and along the reservoir waterline. The embankment's downstream slope is quite irregular, consisting of extensive coarse coal refuse deposits. The slope is unvegetated except for a few trees near the crest, and some swamp-type vegetal growth at several locations near the toe. Local slopes on the downstream face range from nearly vertical in some of the deep erosional cuts, to approximately angle of repose slopes at other points.	

PRINCIPAL SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
INTAKE STRUCTURE	The principal spillway intake structure is the upstream end of a 12 inch diameter steel pipe that is protected by a wire screen trash cage which is approximately 3 feet by 5 feet in plan and approximately 3 feet deep. The wire screen has 2 inch openings. On the date of inspection, the trash cage was clogged by silt and debris to a height of approximately 2.0 feet above the invert of the principal spillway conduit. The approach channel to the intake structure was generally silted and overgrown by swamp-type vegetal growth.	
CONDUIT	The only visible portion of the principal spillway conduit was at the intake structure. It appeared to be in good condition.	
OUTLET STRUCTURE	The outlet end of the principal spillway conduit was not observed. The owner's representative indicated that the conduit passed beneath the massive refuse disposal area and discharges to Meadow Run approximately 1500 feet to the south.	
EMERGENCY GATE	None observed.	

EMERGENCY SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
APPROACH CHANNEL	The approach channel to the emergency spillway was generally clear, except at the immediate inlet end of the pipe, where a mound of coarse coal refuse has been placed, partially blocking the inlet to the pipe.	
CONDUIT	The emergency spillway conduit is an asphalt-coated, 48 in. diameter corrugated metal pipe.	
DISCHARGE CHANNEL	The emergency spillway pipe discharges directly to the embankment's downstream slope, just below the crest of the dam. The discharge channel consists of a significant erosional gully in the embankment's downstream slope. According to the owner's representative, however, the emergency spillway has never operated, and the erosional gully in the downstream slope has been caused by natural runoff and seepage flows.	

INSTRUMENTATION

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
MONUMENTATION/SURVEYS	None observed.	
WEIRS	None observed.	
PIEZOMETERS	Five piezometers were observed at two locations on the embankment's crest. Near the downstream slope, piezometers, having depths of 100, 123, and 138 feet, were observed. Near the upstream slope, two piezometers, having depths of 90 and 125 feet, were observed.	
OBSERVATION WELLS	Two observation wells were observed at two locations on the embankment crest. Near the downstream slope, an observation well with a depth of 32 feet was observed, and near the upstream slope, an observation well with depth of 60 feet was observed. No water level data was obtained.	

RESERVOIR

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	The reservoir slopes around the perimeter of the pond were moderately steep to steep and were generally barren, being entirely coarse coal refuse materials. The reservoir slopes have suffered some erosion by surface runoff flows from above.	
SEDIMENTATION	According to the owner's representative, the pond is almost entirely filled with fine coal refuse sediments that have been hydraulically deposited by pipeline from the LaBelle Coal Preparation Plant below. On the date of inspection, the depth of free water in the impoundment could not be determined. Considerable sedimentation of the reservoir shoreline has occurred as a result of erosion of the reservoir slopes.	
INLET STREAM	The reservoir has no inlet stream.	
WATERSHED	The watershed for the pond consists of coarse coal refuse which are entirely unvegetated. The watershed is comprised generally of a narrow band of land that borders the perimeter of the pond. The upper end of the pond is gradually being filled by a continuous deposition of coarse coal refuse.	

DOWNSTREAM CONDITIONS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CHANNEL OBSTRUCTIONS, DEBRIS, ETC.)	The downstream channel for the emergency spillway lies across the embankment's downstream slope and discharges into a drainage swale below the toe of the embankment that has been constructed to carry runoff from the embankment to a sedimentation pond approximately 1400 feet below the dam. A similar channel collects runoff from the embankment's left flank and adjacent refuse disposal area, and channels it to a second sedimentation pond below the dam's toe. Both sedimentation ponds have been incised into natural ground. On the date of inspection, both channels were generally clear of obstructions and were barren to partially vegetated. The owner's representative indicated that construction of the channels and downstream ponds had been completed last year, and that vegetation was still in the germination stage.	
APPROXIMATE NUMBER OF HOMES AND POPULATION	One inhabited dwelling, a major local highway, a major railyard, and the Maxwell Lock and Dam of the United States Army Corps of Engineers lie in the reach immediately below the LaBelle Slurry Pond 3. The lock and dam are approximately 3,000 feet below the toe of the impounding embankment.	

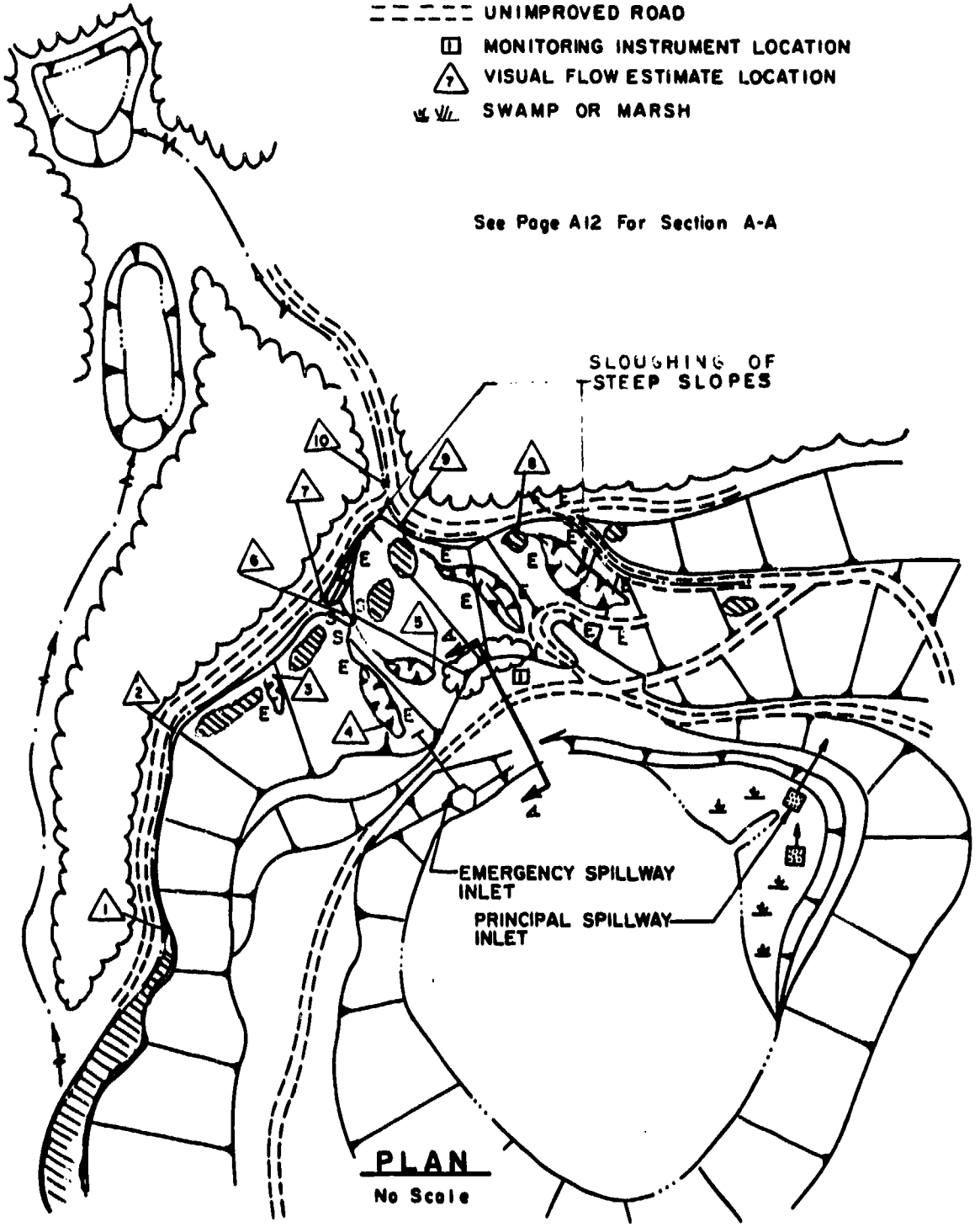
VISUAL FLOW ESTIMATES

Location	G.P.M.	Source
1	1 - 2	SWAMP
2	3 - 5	CHANNEL
3	3 - 5	SWAMP
4	6 - 8	SPRING
5	<1/2	SPRING
6	6 - 8	CHANNEL
7	8 - 12	CHANNEL
8	<1/2	SWAMP
9	<1/2	CHANNEL
10	15 - 20	CHANNEL

LEGEND

- IMPOUNDING EMBANKMENT SLOPE
- OTHER SLOPES
- STREAM OR SHORELINE
- SURFACE DRAINAGE COURSE
- SWAMPY AREA
- CONCRETE STRUCTURE
- E EROSION
- S SPRING
- UNIMPROVED ROAD
- MONITORING INSTRUMENT LOCATION
- VISUAL FLOW ESTIMATE LOCATION
- SWAMP OR MARSH

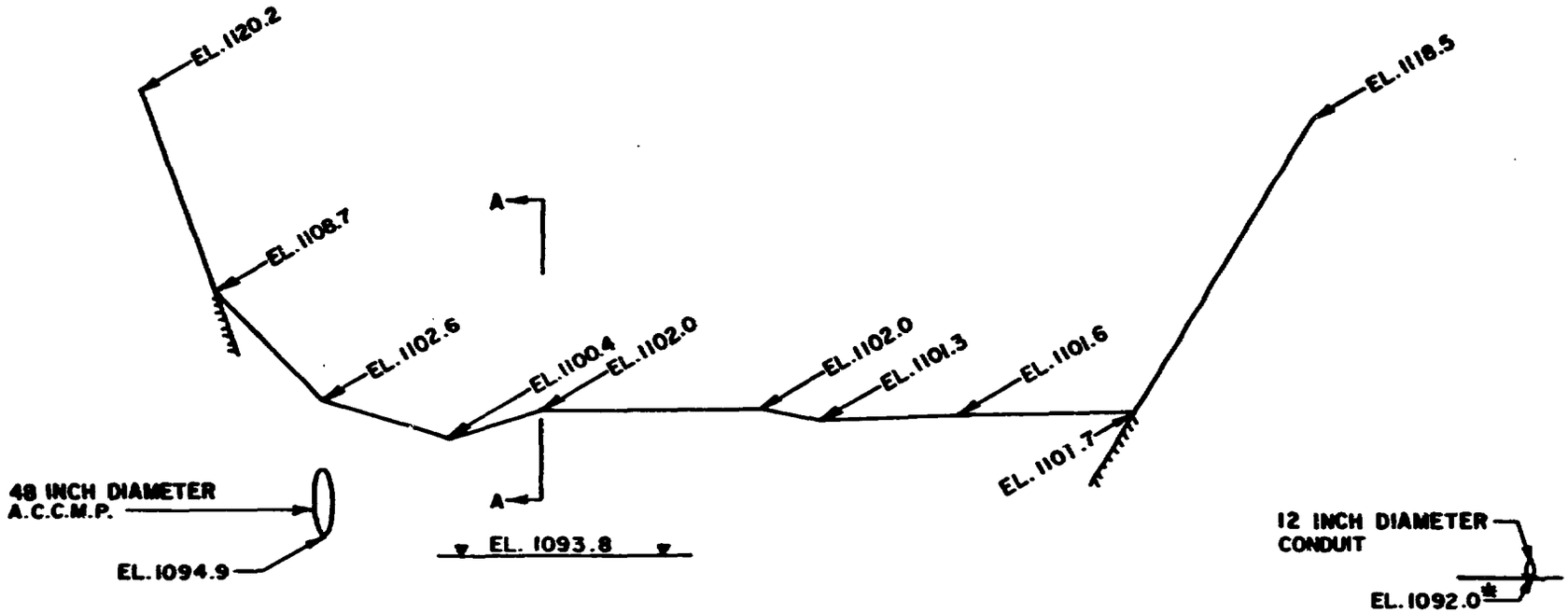
See Page A12 For Section A-A



PLAN
No Scale

DATE: JULY 1981	LABELLE SLURRY POND 3 NATIONAL DAM INSPECTION PROGRAM	FIELD SKETCH
SCALE: NONE		
DR: JF CK: JEB	ACKENHEIL & ASSOCIATES CONSULTING ENGINEERS GEO SYSTEMS, INC. 1000 BANKSVILLE RD./PITTSBURGH, PA. 15216	
DWG. NO. 80138A-1		

PR 8717-878



A11

CREST PROFILE

(LOOKING DOWNSTREAM)

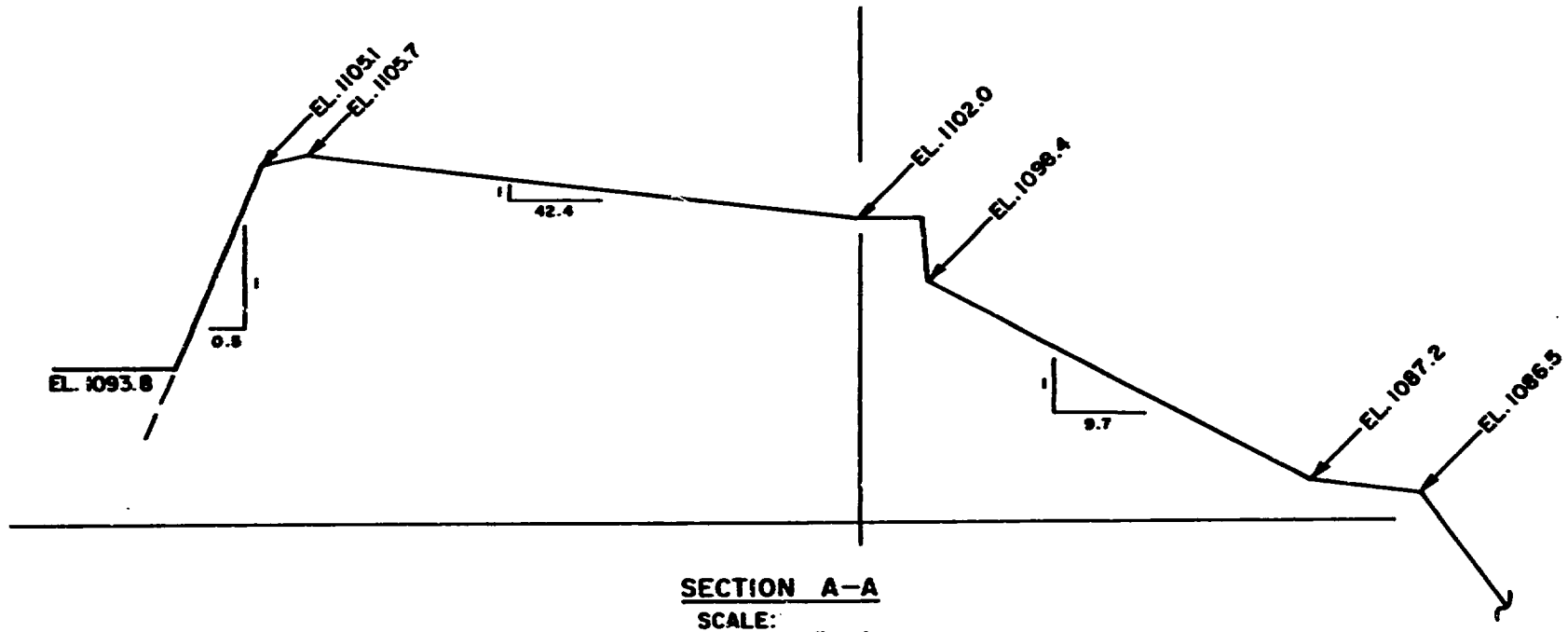
SCALE:

HORZ. 1"=200'

VERT. 1"= 10'

* Assumed Benchmark For Field Measurements

DATE: JULY 1981		LABELLE SLURRY POND 3 NATIONAL DAM INSPECTION PROGRAM	FIELD PROFILE
SCALE: AS SHOWN			
DR: JF	CK: JEB	ACKENHEIL & ASSOCIATES CONSULTING ENGINEERS GEO SYSTEMS, INC. 1000 BANKSVILLE RD./PITTSBURGH, PA. 15216	
DWG. NO. 80138A-3			



SECTION A–A

SCALE:
HORZ. 1"=50'
VERT. 1"=10'

NOTE: A COMPLETE SECTION OF THE EMBANKMENT, AT ITS APPROXIMATE STEEPEST SECTION, IS SHOWN ON SECTION B-B, DWG. A-3965 SHEET 7/10, PLATE VII, APPENDIX E

See Page A 10 For Section A-A Location

DATE: JULY 1981	LABELLE SLURRY POND 3 NATIONAL DAM INSPECTION PROGRAM	FIELD SECTION
SCALE: AS SHOWN		
DR: JF CK: JEB	ACKENHEIL & ASSOCIATES CONSULTING ENGINEERS GEO SYSTEMS, INC. 1000 BANKSVILLE RD./PITTSBURGH, PA. 15216	
DWG. NO. 80138A-2		

APPENDIX B

ENGINEERING DATA CHECKLIST

CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE I

NAME OF DAM LaBelle Slurry Pond 3
I.D. No. PA 00295

ITEM	REMARKS
*Design Drawings	Drawings by Orbital Engineering, Carnegie, Pennsylvania for Jones and Laughlin Steel Corporation, Vesta-Shannopin Coal Division, LaBelle Coal Refuse Disposal Facility, Operation and Abandonment Plan. Sheet 1/10 Stage 1 Plan, Site Location Map and List of Drawings** Sheet 2/10 Stage 2 Plan, General Notes and Legend** Sheet 3/10 Stage 3 Plan and Suggested Construction Sequence** Sheet 4/10 Site Abandonment Plan ** Sheet 5/10 Sedimentation Basins No. 1 and 2, Plans and Sections ** Sheet 6/10 Section A-A Sheet 7/10 Section B-B ** Sheet 8/10 Sections Sheet 9/10 Sections and Details Sheet 10/10 Sections and Details
As-Built Drawings	None available.
Regional Vicinity Map	USGS 7-1/2 Minute California and Carmichaels, Pennsylvania Quadrangle Maps.
*Construction History	Constructed by Jones and Laughlin Steel Corporation personnel. Dates of construction unknown. Constructed of coarse coal refuse from LaBelle Coal Preparation Plant. Fine coal refuse impounded in impoundment zone between 1958 and June 1976.

ITEM	REMARKS
*Typical Sections of Dam	See Design Drawings above.
Outlets-Plans Details Constraints Discharge Ratings	None available.
Rainfall/Reservoir Records	None available.
Design Reports	None available.
Geology Reports	None available.
Design Computations	None available.
Hydrology and Hydraulics	None available.
Dam Stability	None available.
Seepage Studies	None available.
Materials Investigation, Boring Records, Laboratory, Field	None available.
*Post-Construction Surveys of Dam	See Design Drawings above.

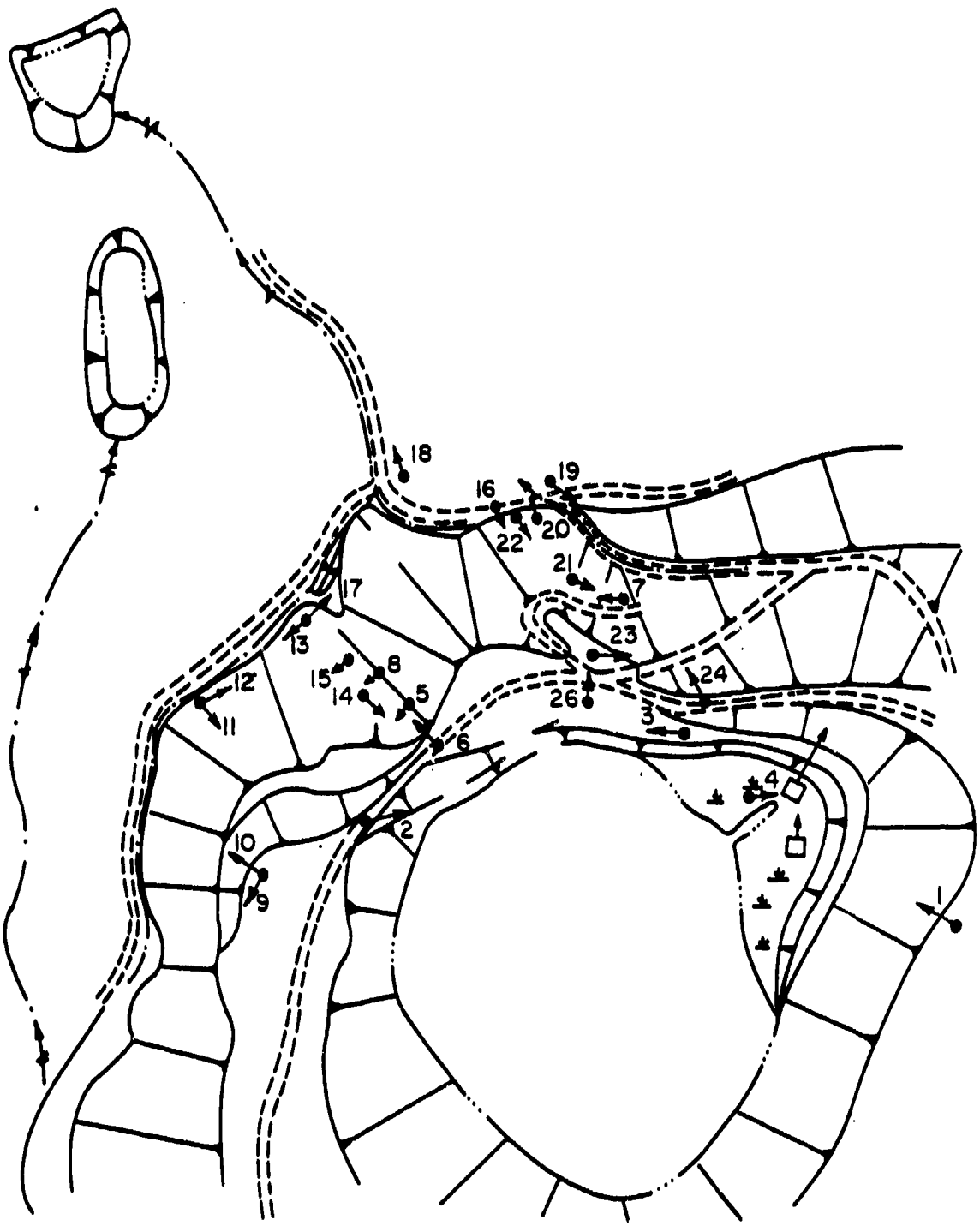
ITEM	REMARKS
Borrow Sources	No Data Available.
Monitoring Systems	None reported.
*Modifications	See Design Drawings above.
High Pool Records	None available.
Post-Construction Engineering Studies and Reports	None available.
Maintenance, Operation, Records	None available.
Spillway-Plan Sections Details	None available.
Operating Equipment Plans and Details	None available.
Specifications	None available.

* Information provided by J & L Steel Corporation
**Reduced size reproduction contained in Appendix E.

APPENDIX C

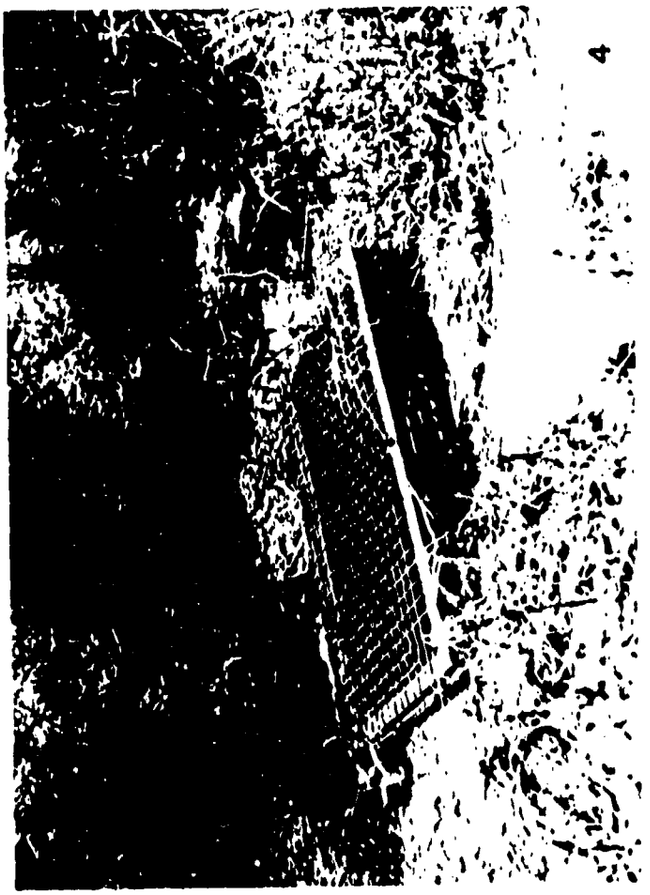
PHOTOGRAPHS

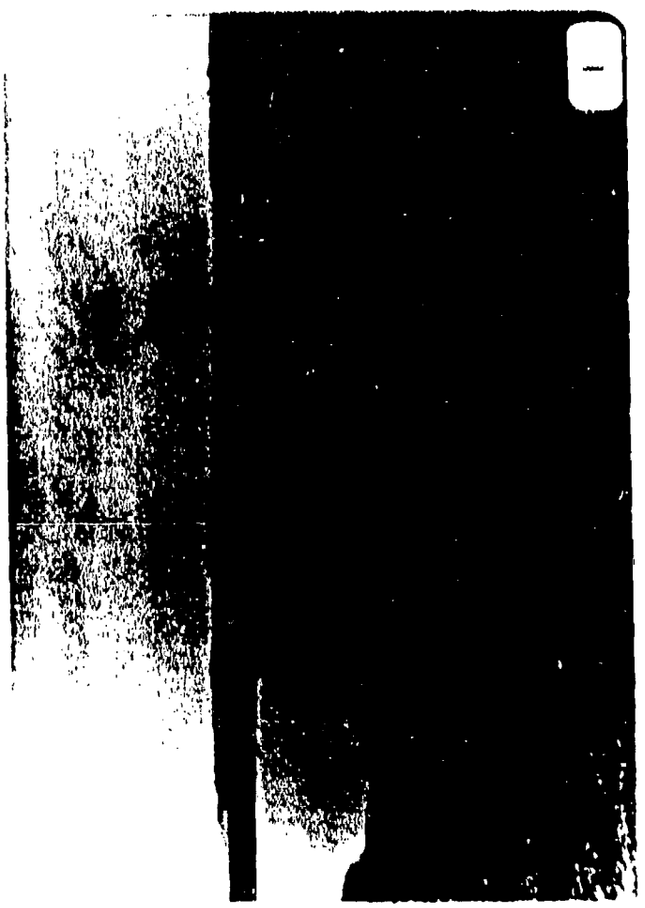
PHOTO 25, 27 and 28 LOCATIONS
ARE NOT SHOWN



DATE: JULY 1981	LABELLE SLURRY POND 3 NATIONAL DAM INSPECTION PROGRAM	PHOTO KEY MAP
SCALE: NONE		
DR: JF CK: JEB	ACKENHEIL & ASSOCIATES CONSULTING ENGINEERS GEO SYSTEMS, INC. 1000 BANKSVILLE RD./PITTSBURGH, PA. 15216	

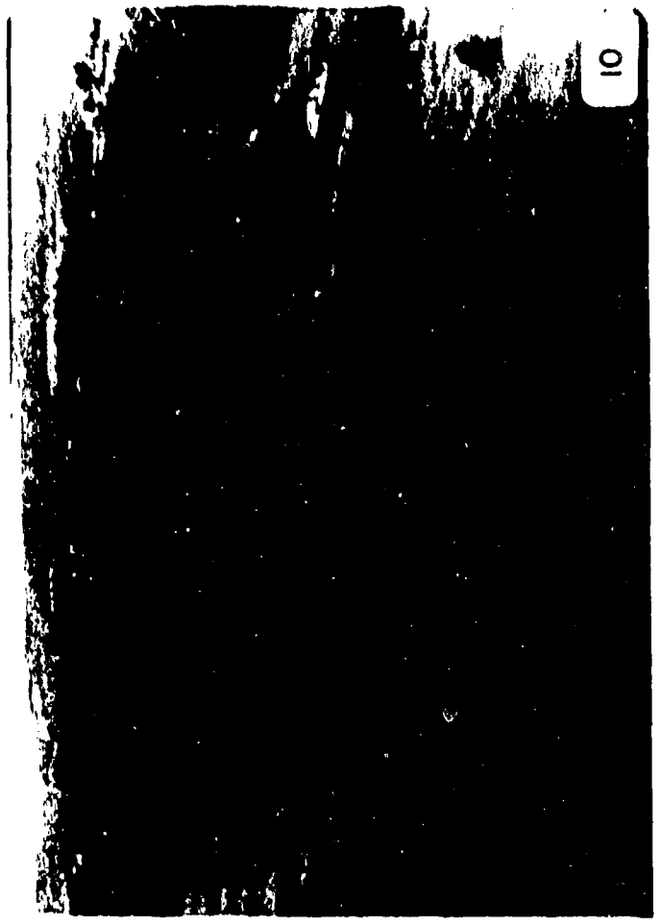
LABELLE SLURRY POND 3





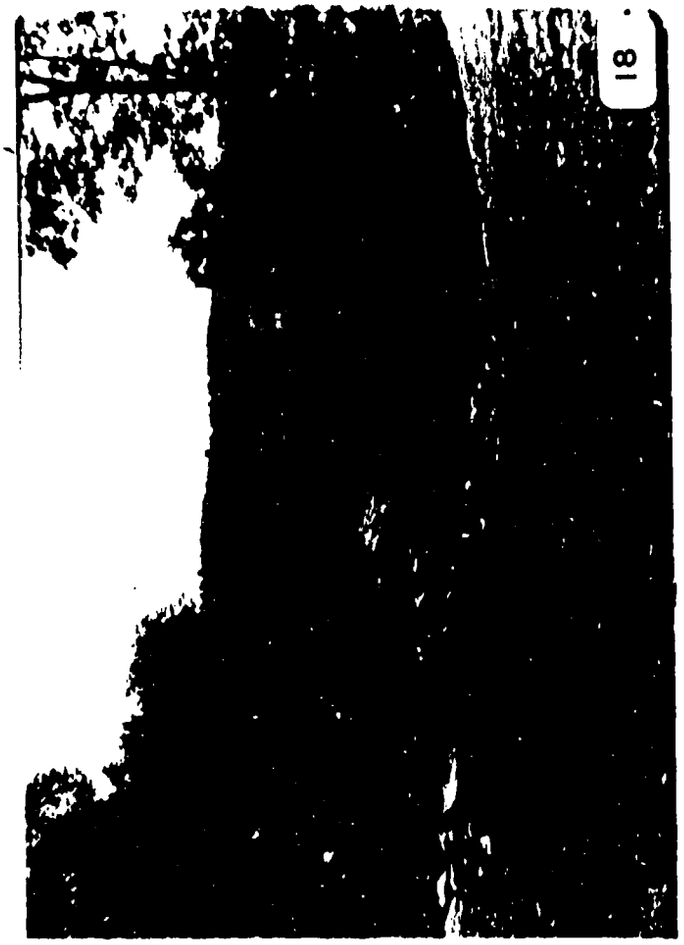
LABELLE SLURRY POND 3

LABELLE SLURRY POND 3

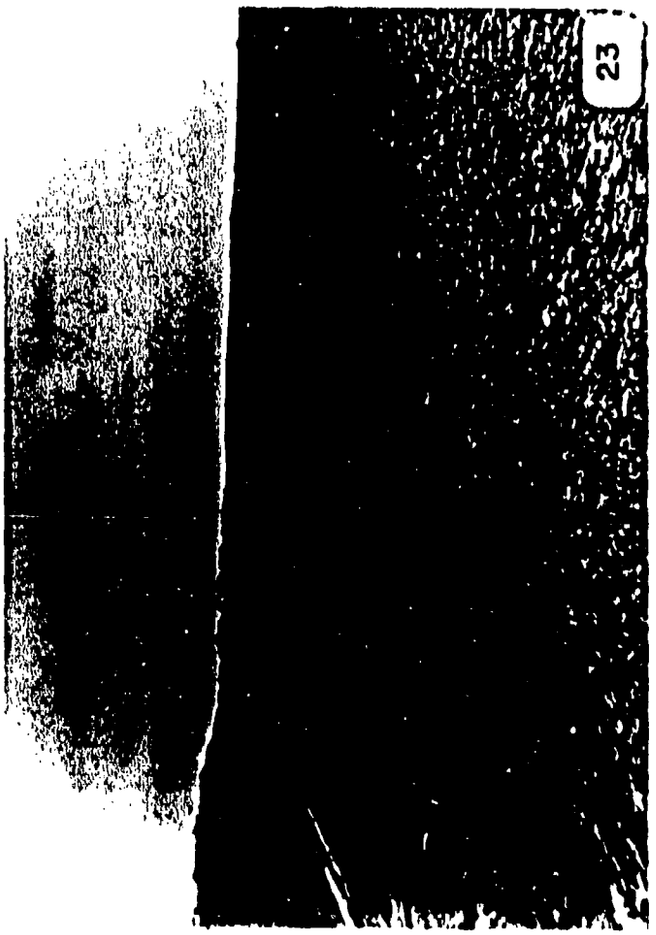


LABELLE SLURRY POND 3

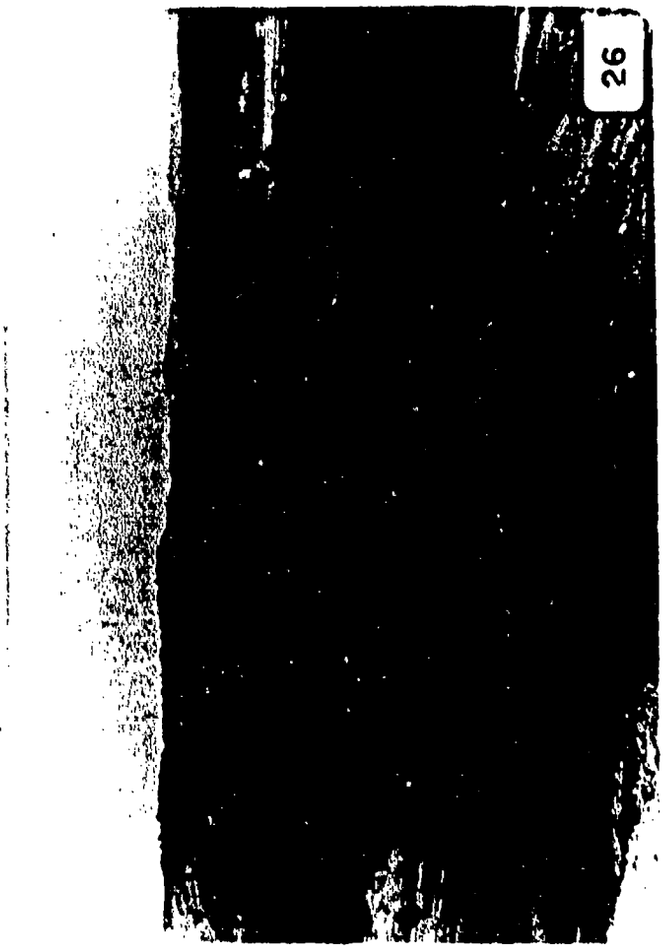
LABELLE SLURRY POND 3

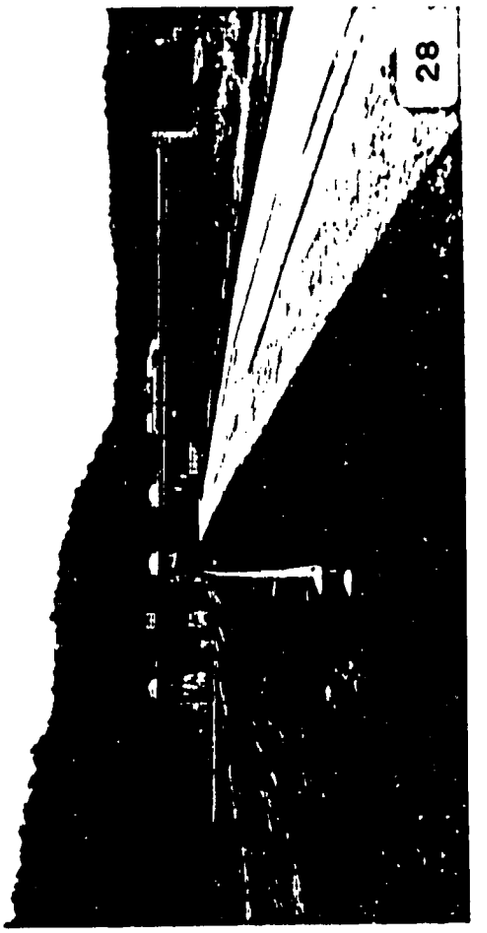


LABELLE SLURRY POND 3



LABELLE SLURRY POND 3





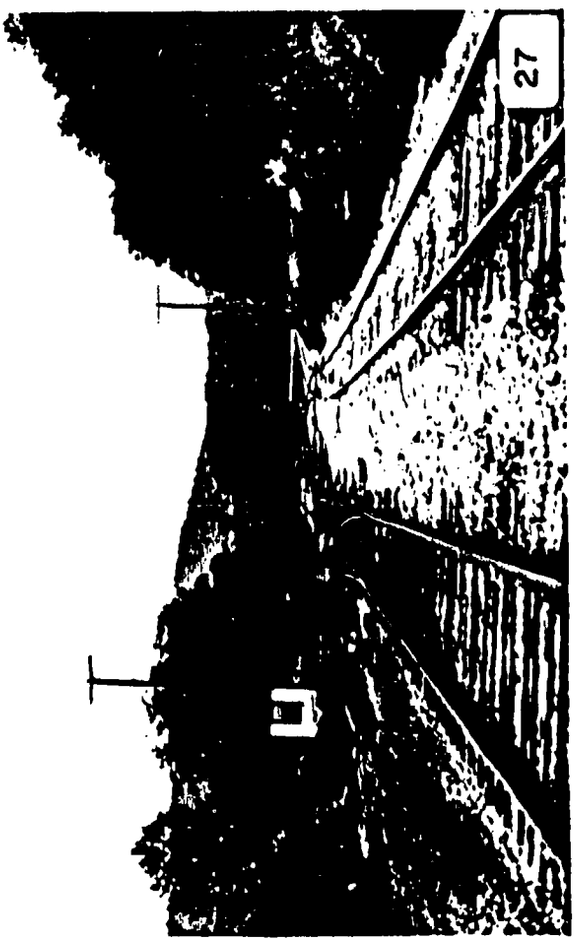


PHOTO DESCRIPTIONS

Photo 1 Site Overview from right abutment.

Photo 2 Embankment Crest from left abutment.

Photo 3 Crest and Upstream Slope.

Photo 4 Principal Spillway Trash Gage.

Photo 5 Emergency Spillway Outlet.

Photo 6 Erosion Gullies below Emergency Spillway Outlet.

Photo 7 Erosion Gully on right portion of downstream slope.

Photo 8 Erosion Gully with seepage in central portion of downstream slope.

Photo 9 Downstream Slope and Left Abutment showing swampy conditions in left groin.

Photo 10 Downstream Slope and Left Abutment showing swampy conditions in left groin.

Photo 11 Downstream Slope, Left Portion showing erosion gullies.

Photo 12 Downstream Slope, Central Portion showing erosion gullies and swampy area at embankment toe.

Photo 13 Seepage from swampy area in left groin.

Photo 14 Seepage in deep erosional gully.

Photo 15 Seepage from slope of deep erosional gully.

Photo 16 Seepage from swampy area on right portion of downstream slope.

Photo 17 Erosion Gully in sediments at downstream toe of embankment.

Photo 18 Downstream Channel.

Photo 19 Erosion of Embankment, right abutment area.

Photo 20 Erosion of Groin, right abutment area.

Photo 21 Erosional Gullies on right portion of downstream slope.

Photo 22 Erosional Gullies on right portion of downstream slope.

Photo 23 Right Abutment Area from embankment crest.

Photo 24 Downstream Slope from right abutment area.

Photo 25 Downstream Hazard, inhabited dwelling.

Photo 26 Overview of Downstream Area, showing sediment pond and Maxwell Lock and Dam.

Photo 27 Downstream Hazard, railyard.

Photo 28 Downstream Hazard, Maxwell Lock and Dam.

APPENDIX D

HYDROLOGY AND HYDRAULICS ANALYSES

APPENDIX D
HYDROLOGY AND HYDRAULICS ANALYSES

Methodology: The dam overtopping analysis was accomplished using the systemized computer program HEC-1 (Dam Safety Version), July, 1978, prepared by the Hydrologic Engineering Center, U.S. Army Corps of Engineers, Davis, California. A brief description of the methodology used in the analysis is presented below.

1. Precipitation: The Probable Maximum Precipitation (PMP) is derived and determined from regional charts prepared from past rainfall records including "Hydrometeorological Report No. 33" prepared by the U.S. Weather Bureau.

The index rainfall is reduced from 10% to 20% depending on watershed size by utilization of what is termed the HOP Brook adjustment factor. Distribution of the total rainfall is made by the computer program using distribution methods developed by the Corps.

2. Inflow Hydrograph: The hydrologic analysis used in development of the overtopping potential is based on applying a hypothetical storm to a unit hydrograph to obtain the inflow hydrograph for reservoir routing.

The unit hydrograph is developed using the Snyder method. This method requires calculation of several key parameters. The following list gives these parameters, their definition and how they were obtained for these analyses.

Parameter	Definition	Where Obtained
Ct	Coefficient representing variations of watershed	From Corps of Engineers*
L'	Distance from centroid of watershed to outlet	From USGS 7.5 minute topographic map
Cp	Peaking coefficient	From Corps of Engineers*
A	Watershed size	From USGS 7.5 minute topographic map

*Developed by the Corps of Engineers on a regional basis for Pennsylvania.

3. Routing: Reservoir routing is accomplished by using Modified Puls routing techniques where the flood hydrograph is routed through reservoir storage. Hydraulic capacities of the outlet works, spillways and the crest of the dam are used as outlet controls in the routing.

The hydraulic capacity of the outlet works can either be calculated and input or sufficient dimensions input and the program will calculate an elevation-discharge relationship.

Storage in the pool area is defined by an area-elevation relationship from which the computer calculates storage. Surface areas are either planimetered from available mapping or USGS 7.5 minute series topographic maps or taken from reasonably accurate design data.

4. Dam Overtopping: Using given percentages of the PMF, the computer program will calculate the percentage of the PMF which can be controlled by the reservoir and spillway without the dam overtopping.

HYDROLOGIC AND HYDRAULIC ENGINEERING DATA

DRAINAGE AREA CHARACTERISTICS: Coarse coal refuse.

ELEVATION-TOP NORMAL POOL (STORAGE CAPACITY): 1092.0 (114 acre-feet)

ELEVATION-TOP FLOOD CONTROL POOL (STORAGE CAPACITY): 1100.4 (318 acre-feet)

ELEVATION-MAXIMUM DESIGN POOL: Unknown

ELEVATION-TOP DAM: 1102.5 (average) 1100.4 (minimum)

PRINCIPAL SPILLWAY (Active Inlet)

a. Elevation 1092
b. Type Steel pipe conduit (12 inch diameter) with a wire screen trash cage.
c. Location Right reservoir shoreline on upstream of dam.
d. Gate/Control None observed.

EMERGENCY SPILLWAY

a. Type 48 inch diameter ACCMP
b. Location At left side of embankment
c. Entrance Invert 1094.9
d. Exit Invert 1092.3
e. Gate/Control None

HYDROMETEOROLOGICAL GAGES

a. Type None
b. Location N/A
c. Records None

MAXIMUM REPORTED NON-DAMAGING DISCHARGE None reported

HEC-1 DAM SAFETY VERSION
HYDROLOGY AND HYDRAULIC ANALYSIS
DATA BASE

NAME OF DAM: LaBelle Slurry Pond 3	NDI ID NO. PA 00295
Probable Maximum Precipitation (PMP)	24.1*
Drainage Area	0.15 sq. mi.
Reduction of PMP Rainfall for Data Fit Reduce by 20%, therefore PMP rainfall	0.8 (24.1) =19.3 in.
Adjustments of PMF for Drainage Area (Zone 7)	
6 hrs.	102%
12 hrs.	120%
24 hrs.	130%
48 hrs.	140%
Snyder Unit Hydrograph Parameters	
Zone	29**
C_p	0.50
C_t	1.6
L'=	0.20 mile
$t_p = C_t (L')^{0.6}$	0.61 hour
Loss Rates	
Initial Loss	1.0 inch
Constant Loss Rate	0.05 inch/hour
Base Flow Generation Parameters	
Flow at Start of Storm	1.5 cfs/sq.mi=0.23 cfs
Base Flow Cutoff	0.05 x Q peak
Recession Ratio	2.0

---

*Hydrometerological Report 33
**Hydrological zone defined by Corps of Engineers, Baltimore District, for determining Snyder's Coefficients (C_p and C_t).

ACKENHEIL & ASSOCIATES
GEO Systems, Inc.
1000 Banksville Road
PITTSBURGH, PA. 15216
(412) 531-7111

Job LaBelle Slurry Pond 3 Job No. 80138A
Subject Data Input
Made By JPH Date 6/29/81 Checked JFB Date 6/29/81

Loss Rate and Base Flow Parameters

As Recommended By Corps of Engineers, Baltimore District

STRTL = 1 inch

CNSTL = 0.05 in/hr

STRTQ = 1.5 cfs/mi^2

QRCSN = 0.05 (5% of Peak Flow)

RTIOR = 2.0

Elevation - Area - Capacity Relationships

From USGS 7.5 min Quad, Penn Dec fices, Field Inspection Data, and Owner provided information.

At Elevation	1092	Area = 21.1 acres
At Elevation	1096	Area = 24.6 Acres
At Elevation	1100	Area = 26.4 acres
At Elevation	1125	Area = 39.3 acres

From Data As of 28 April 1976

At elevation 1090 Area = 30 acres storage = 50 acre-ft.

At elevation 1099 Area = 49 acres storage = 430 acre-ft.

Principal Spillway Inlet Invert = 1092.0 (Lower inlet)

Assume pond began with pool at elevation 1092

Calculate storage below 1092, Assuming conic section.

S_{1092} = 113.8 Acre feet

ACKENHEIL & ASSOCIATES
GEO Systems, Inc.
1000 Banksville Road
PITTSBURGH, PA. 15216
(412) 531-7111

Job LaBelle Slurry Pond 3 Job No. 3012.1

Subject Data Input

Made By JHH Date 6/26/91 Checked JPB Date 6/29

From Conic Method for Reservoir Volume
Flood Hydrograph Package (HEC-1)
Dam Safety Version (Users Manual)

$$H = 3V/A = \frac{3(113.8)}{21.1} = 16.2$$

Elevation where Area Equals Zero 1092.0 - 16.2 = 1075.8

$A	0.	21.1	24.6	26.4	39.3
$E	1075.8	1092.	1096.	1100.	1125.

Overtop Parameters

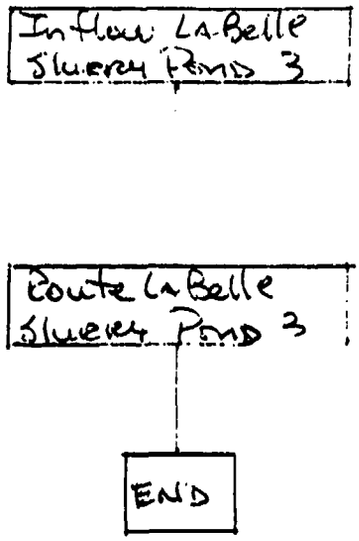
Top of Dam Elevation (Minimum)	1100.4
Length of Dam	1000 feet
Coefficient of Discharge	3.09

The 48 inch diameter CMP emergency spillway and the 12 inch Diameter steel pipe Principal Spillway were assumed Blocked in the HEC analysis. The routing was begun at the invert elevation of the principal spillway invert plus three feet to allow for the observed, partially blocked trash cage.

ACKENHEIL & ASSOCIATES
GEO Systems, Inc.
1000 Banksville Road
PITTSBURGH, PA. 15216
(412) 531-7111

Job LaBelle Slurry Pond 3 Job No. 2012.5A
Subject Data Input
Made By JPH Date 6/25/91 Checked JAB Date 6/24

Program Schedule



```
**********
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION     JULY 1978
  LAST MODIFICATION  26 FEB 79
**********
    1              A1       NATIONAL PROGRAM FOR THE INSPECTION OF NON FEDERAL DAMS
    2              A2       HYDROLOGIC AND HYDRAULIC ANALYSIS OF LABELLE SLURRY POND 3
    3              A3       PROBABLE MAXIMUM FLOOD PMF/UNIT HYDROGRAPH BY SNYDER'S METHOD
    4              B   300       0      10       0       0       0       0       0      -4       0
    5              B1    5
    6              J     1       2       1
    7              J1   1.      .5
    8              K     0       1                                       1
    9              K1       INFLOW HYDROGRAPH FOR LABELLE SLURRY POND 3
   10              M     1       1     .15             .15                                       1
   11              P             24.1     102     120     130     140
   12              T                                                     1.0     .05
   13              W  0.61    0.50
   14              X  -1.5   -0.05     2.0
   15              K     1       2                                       1
   16              K1       ROUTING AT LABELLE SLURRY POND 3
   17              Y                                     1       1
   18              Y1    1                                                -1095.0
   19              $A    0.    21.1    24.6    26.4    39.3
   20              $E1075.8    1092.   1096.   1100.   1125.
   21              $$1094.9   0.001    3.09     1.5
   22              $D1100.4    3.09     1.5    960.
   23              $L   20.     80.    535.    630.    910.    955.    985.   1020.
   24              $V1100.4    1101.  1101.6   1102.  1102.5   1103.   1104.   1105.
   25              K    99
   26              A
   27              A
   28              A
   29              A
   30              A

                        PREVIEW OF SEQUENCE OF STREAM NETWORK CALCULATIONS

                                RUNOFF HYDROGRAPH AT          1
                                ROUTE HYDROGRAPH TO           2
                                END OF NETWORK

**********
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION     JULY 1978
  LAST MODIFICATION  26 FEB 79
**********

RUN  DATE: 24 JUN 81
RUN  TIME: 12.48.16

                        NATIONAL PROGRAM FOR THE INSPECTION OF NON FEDERAL DAMS
                        HYDROLOGIC AND HYDRAULIC ANALYSIS OF LABELLE SLURRY POND 3
                        PROBABLE MAXIMUM FLOOD PMF/UNIT HYDROGRAPH BY SNYDER'S METHOD

                                        JOB SPECIFICATION
                    NQ      NHR     NMIN     IDAY     IHR     IMIN    METRC     IPLT     IPRT    NSTAN
                   300        0       10        0       0        0        0        0       -4        0
                                              JOPER     NWT   LROPT   TRACE
                                                  5       0       0       0

                                MULTI-PLAN ANALYSES TO BE PERFORMED
                                    NPLAN= 1 NRTIO= 2 LRTIO= 1
                            RTIOS=    1.00    0.50

          **********          **********          **********          **********          **********
```

SUB-AREA RUNOFF COMPUTATION

INFLOW HYDROGRAPH FOR LABELLE SLURRY POND 3

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
1	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	0.15	0.0	0.15	0.0	0.0	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.0	24.10	102.00	120.00	130.00	140.00	0.0	0.0

TRSPC COMPUTED BY THE PROGRAM IS 0.800

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.0	0.0	1.00	0.0	0.0	1.00	1.00	0.05	0.0	0.0

UNIT HYDROGRAPH DATA

TP= 0.61 CP=0.50 NTA= 0

RECESSION DATA

STRTQ= -1.50 QRCSN= -0.05 RTIOR= 2.00

UNIT HYDROGRAPH 29 END-OF-PERIOD ORDINATES, LAG= 0.62 HOURS, CP= 0.50 VOL= 1.00

10.	35.	64.	77.	71.	58.	48.	39.	32.	26.
22.	18.	15.	12.	10.	8.	7.	5.	4.	4.
3.	2.	2.	2.	1.	1.	1.	1.	1.	

0

END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
									SUM	26.99	24.57	2.42	14253.
										(686.)	(624.)	(61.)	(403.60)

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

ROUTING AT LABELLE SLURRY POND 3

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
2	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.0	0.0	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.0	0.0	0.0	-1095.	0

SURFACE AREA=	0.	21.	25.	26.	39.
CAPACITY=	0.	114.	205.	307.	1123.
ELEVATION=	1076.	1092.	1096.	1100.	1125.

CREL	SPWID	COQW	EXPW	ELEVL	COQL	CAREA	EXPL
1094.9	0.0	3.1	1.5	0.0	0.0	0.0	0.0

DAM DATA

TOPEL	COQD	EXPD	DAMWID
1100.4	3.1	1.5	960.

CREST LENGTH	20.	80.	535.	630.	910.	955.	985.	1020.
AT OR BELOW ELEVATION	1100.4	1101.0	1101.6	1102.0	1102.5	1103.0	1104.0	1105.0

PEAK OUTFLOW IS 208. AT TIME 42.50 HOURS
PEAK OUTFLOW IS 0. AT TIME 50.00 HOURS

********** ********** ********** ********** **********

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS RATIO 1 1.00	 RATIO 2 0.50
HYDROGRAPH AT	1	0.15	1	599.	299.
	(	0.39)	(	16.96)(	8.48)(
ROUTED TO	2	0.15	1	208.	0.
	(	0.39)	(	5.89)(	0.00)(

SUMMARY OF DAM SAFETY ANALYSIS

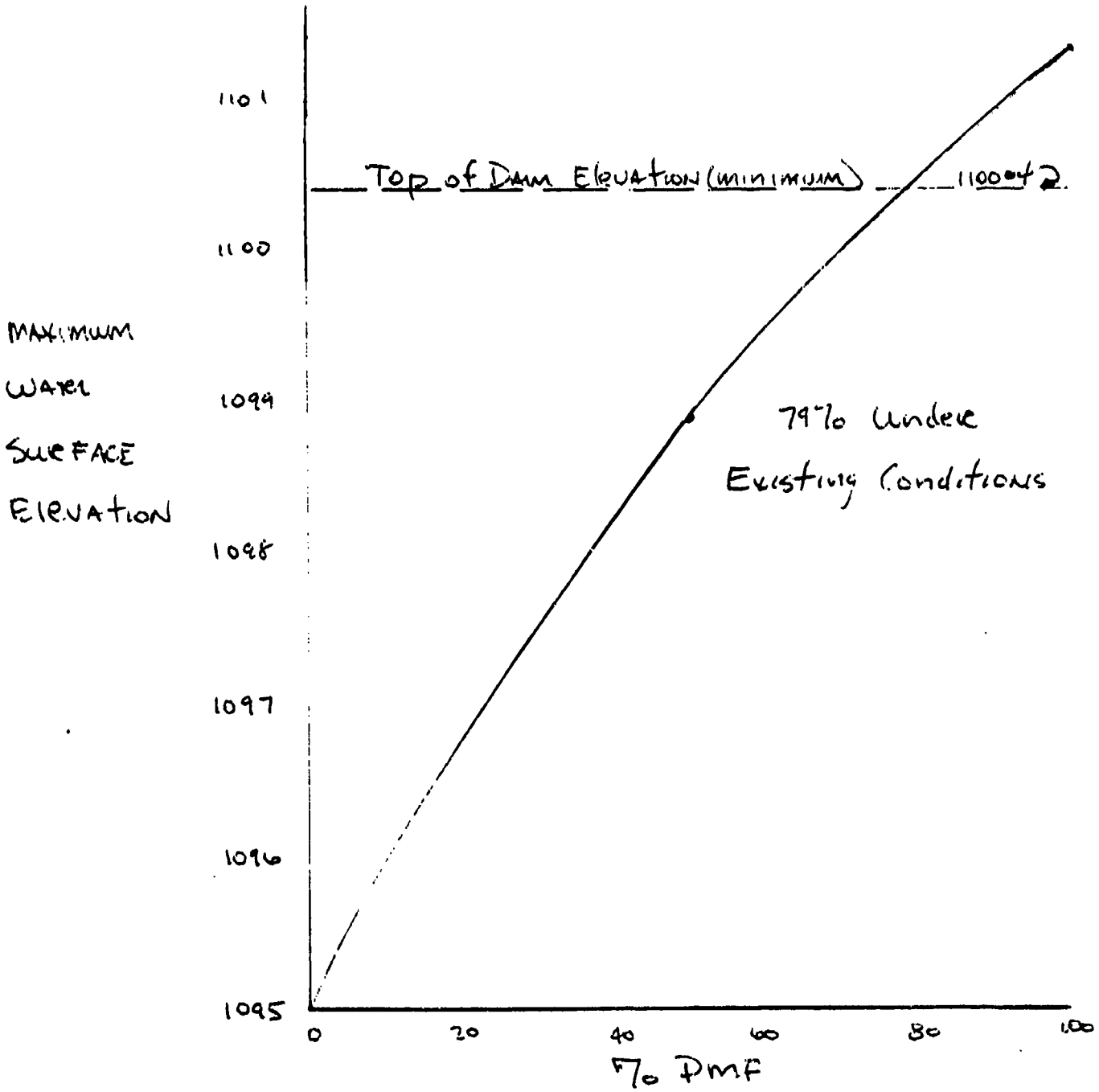
PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1095.00	1094.90	1100.40
STORAGE	181.	179.	318.
OUTFLOW	0.	0.	0.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	1101.34	0.94	343.	208.	9.00	42.50	0.0
0.50	1098.90	0.0	279.	0.	0.0	50.00	0.0

ACKENHEIL & ASSOCIATES
GEO Systems, Inc.
1000 Banksville Road
PITTSBURGH, PA. 15216
(412) 531-7111

Job LaBelle Slurry Pond 3 Job No. 3038A
Subject Hydrologic Performance Plot
Made By SDH Date 6/24/81 Checked JEB Date 6/24/81

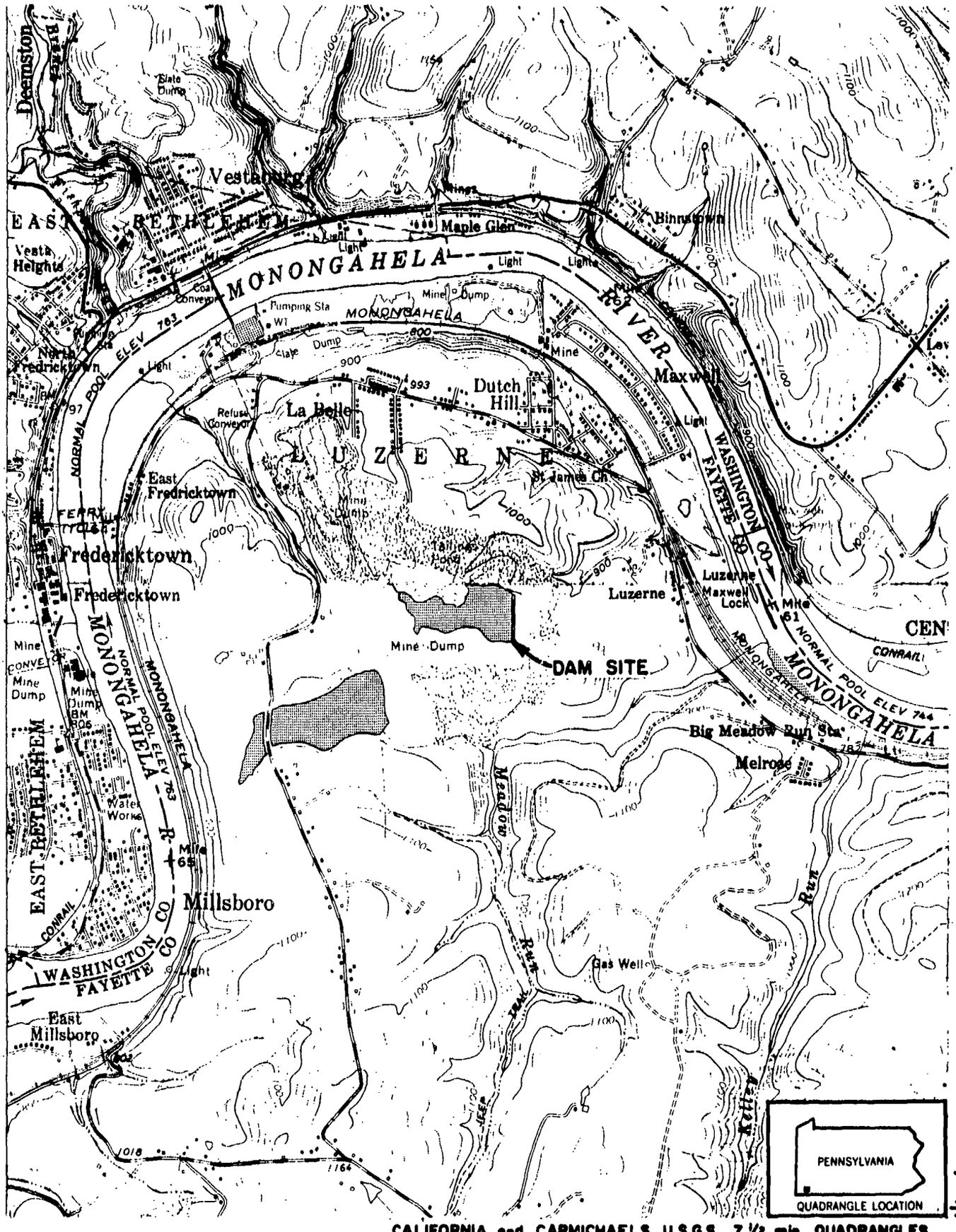


APPENDIX E

PLATES

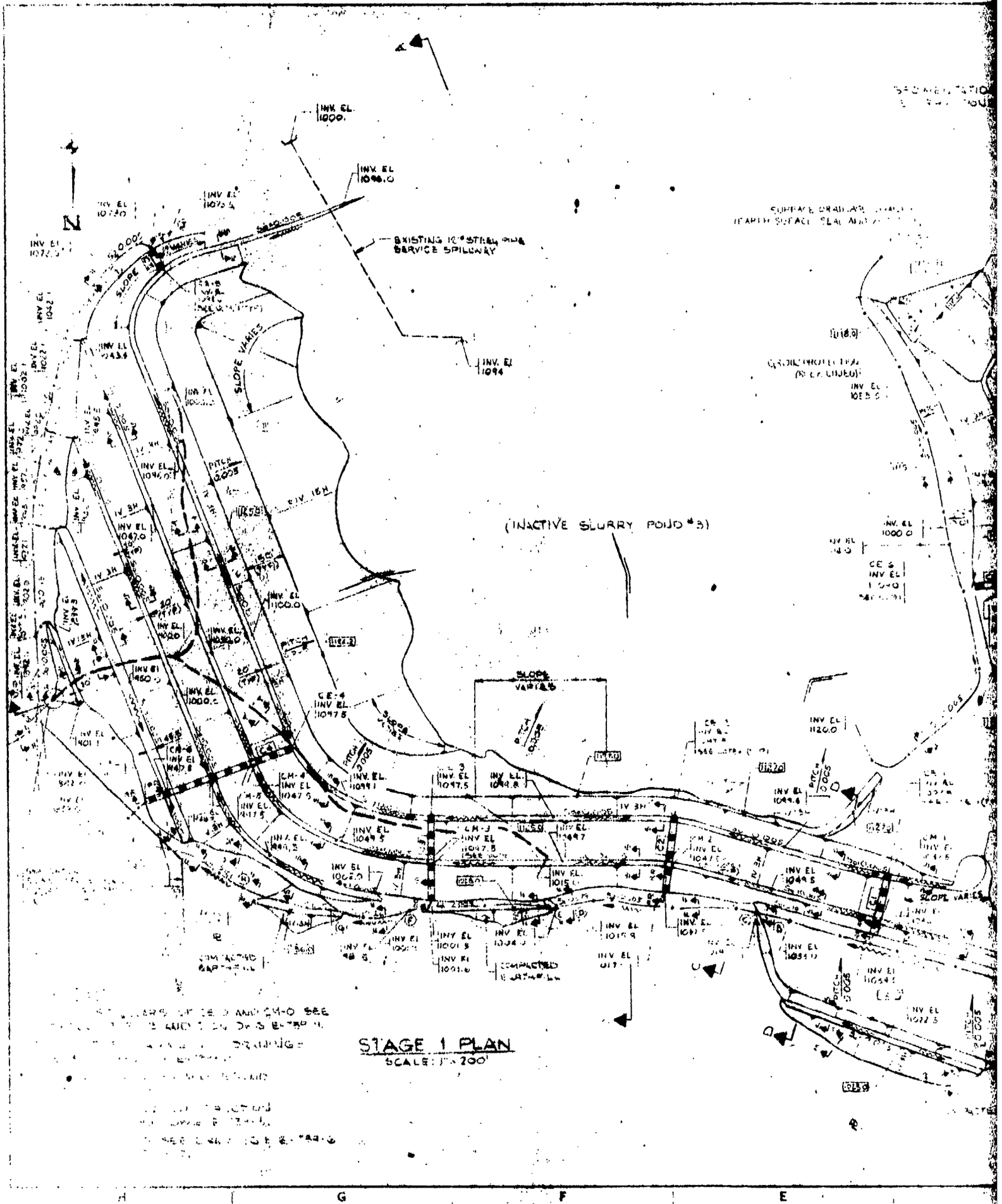
LIST OF PLATES

Plate I	Regional Vicinity Map.
Plate II	Stage 1 Plan, Site Location Map and List of Drawings.
Plate III	Stage 2 Plan, General Notes and Legend.
Plate IV	Stage 3 Plan and Suggested Construction Sequence.
Plate V	Site Abandonment Plan.
Plate VI	Sedimentation Basins Nos. 1 and 2, Plans and Sections.
Plate VII	Section B-B.



CALIFORNIA and CARMICHAELS U.S.G.S. 7 ½ min. QUADRANGLES

DATE: JULY 1981	LABELLE SLURRY POND 3 NATIONAL DAM INSPECTION PROGRAM	REGIONAL VICINITY MAP
SCALE: 1"=2000'		
DR: JF / CK: JEB	ACKENHEIL & ASSOCIATES CONSULTING ENGINEERS GEO SYSTEMS, INC. 1000 BANKSVILLE RD./PITTSBURGH, PA. 15216	
PLATE I		



STAGE 1 PLAN

SCALE: 1" = 200'

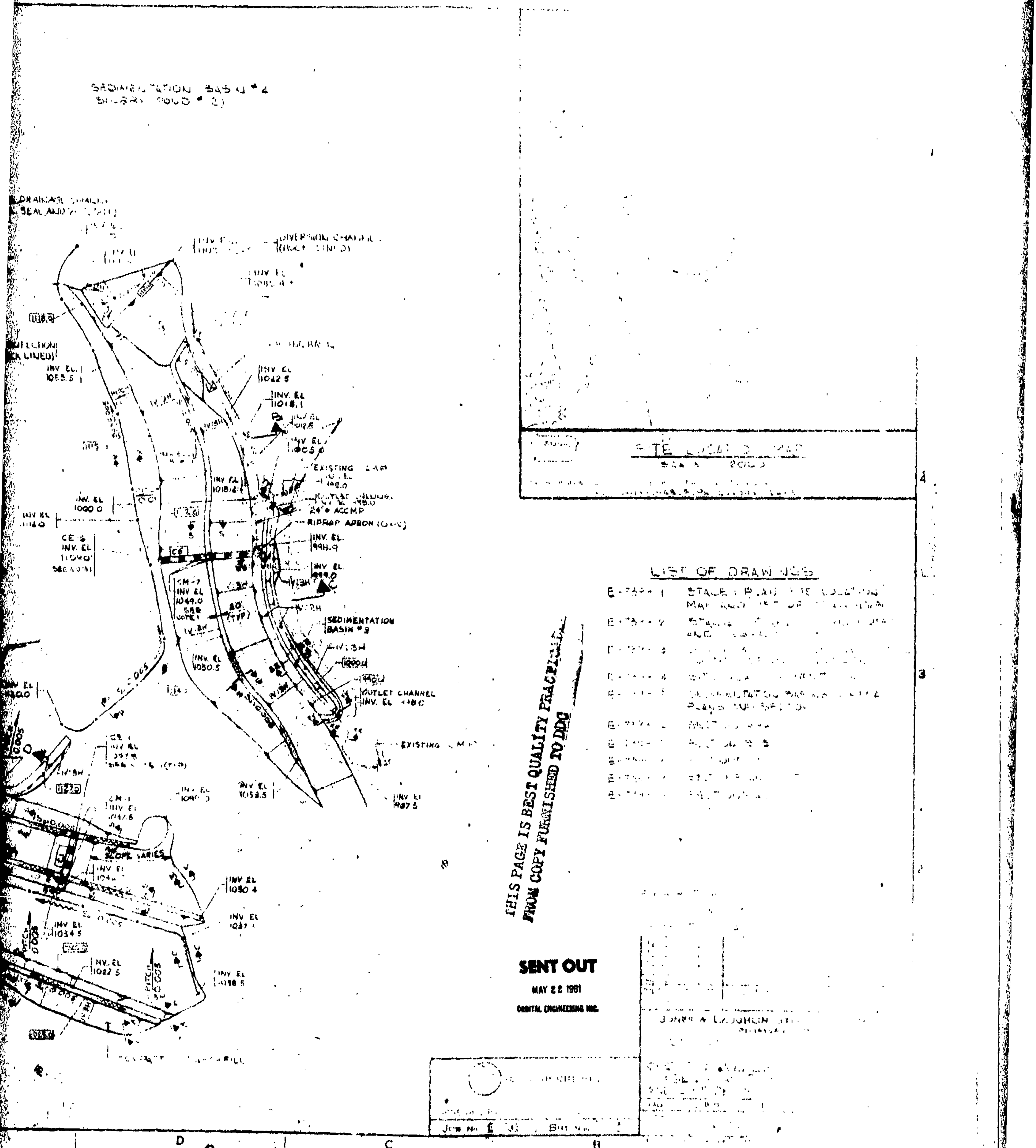
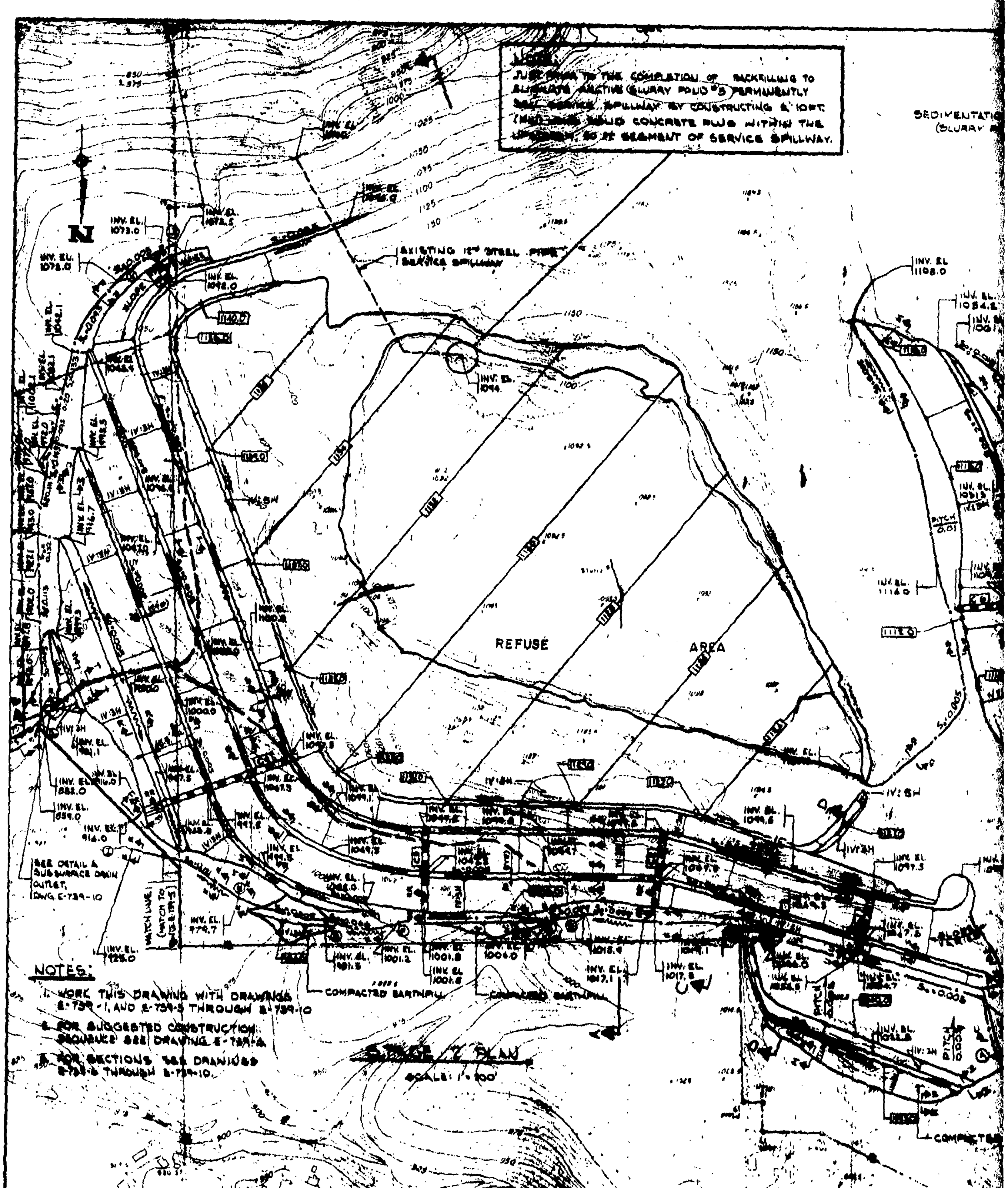
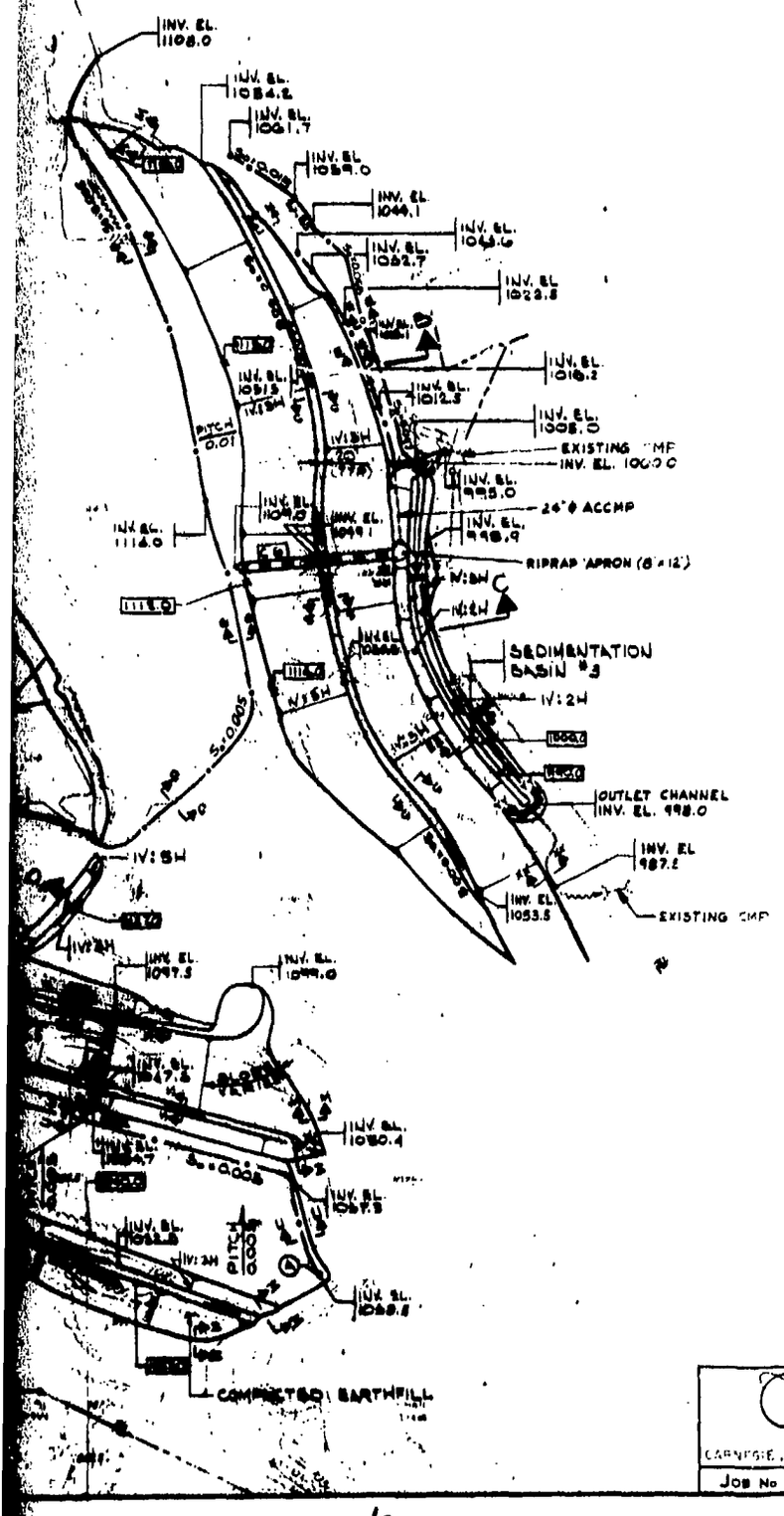


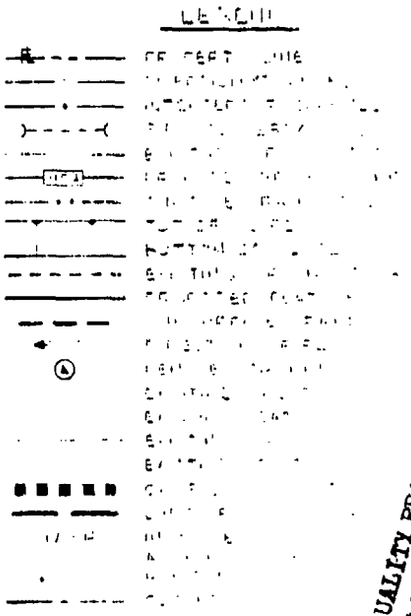
PLATE II



REFUSE AREA
EXISTING 12" STEEL PIPE SERVICE SPILLWAY
SEDIMENTATIO (SLURRY
N
COMPACTED EARTHFILL
SEE DETAIL A SUBSURFACE DRAIN OUTLET, DWG. E-739-10
MATCH LINE
INV. EL. 1073.0
INV. EL. 1092.0
INV. EL. 1108.0
INV. EL. 1094.
INV. EL. 925.0
INV. EL. 979.7
INV. EL. 1001.2
INV. EL. 1006.0
INV. EL. 1017.1
PITCH 0.01
NOTES:
1. WORK THIS DRAWING WITH DRAWINGS E-739-1, AND E-739-5 THROUGH E-739-10
2. FOR SUGGESTED CONSTRUCTION SEQUENCE SEE DRAWING E-739-4
3. FOR SECTIONS SEE DRAWINGS E-739-6 THROUGH E-739-10.
SCALE: 1" = 200'
SERVICE SPILLWAY.

SEDIMENTATION BASIN #4
(SLURRY POND #2)





THIS PAGE IS BEST QUALITY PRACTICABLE
FROM COPY FURNISHED TO DDC

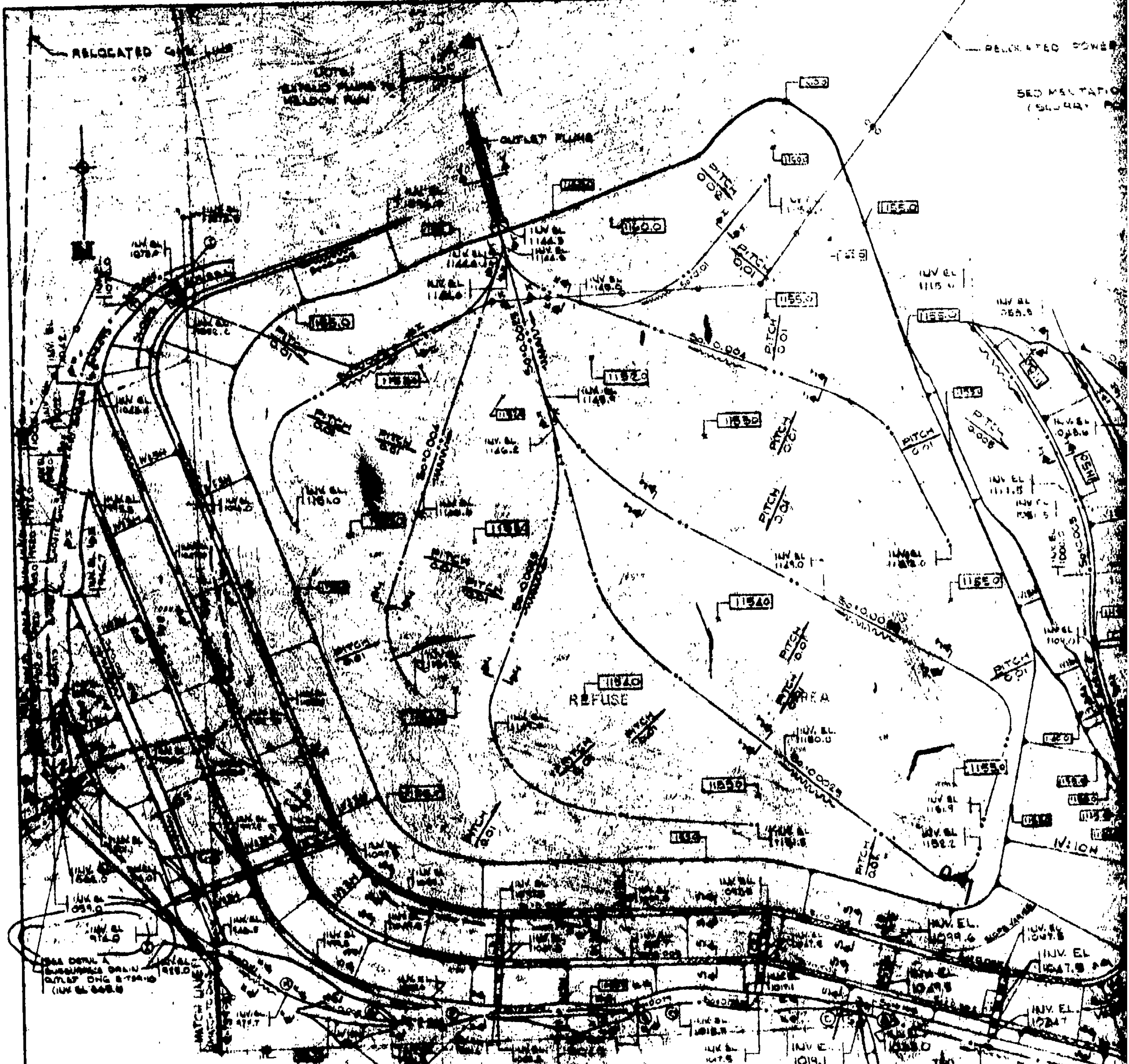
SENT OUT
MAY 22 1981
ORDITAL ENGINEERING INC.

ORDITAL ENGINEERING
CARNEGIE, PA
JOB No [illegible] SHT No [illegible]

JONES & LAUGHLIN STEEL CORPORATION
PITTSBURGH, PA.

PLATE III

1 2



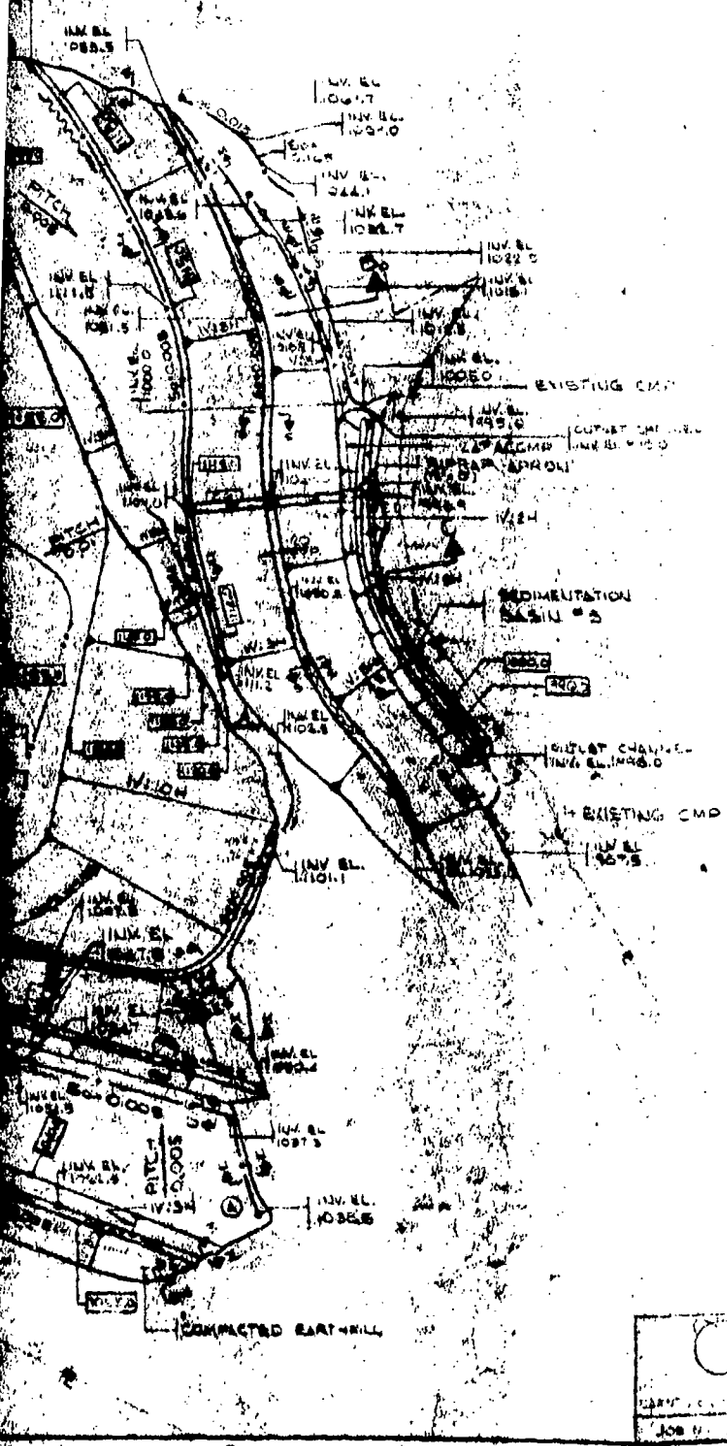
NOTES:

1. WORK THIS DRAWING WITH DRAWINGS E-739-1, E-739-2 AND E-739-4 THROUGH E-739-10.
2. FOR GENERAL NOTES AND LEGEND, SEE DRAWING E-739-2.
3. FOR SUGGESTED CONSTRUCTION SEQUENCE SEE DWG E-739-3
4) FOR SECTIONS SEE DWGS E-739-6 THROUGH E-739-10

STAGE 3 PLAN

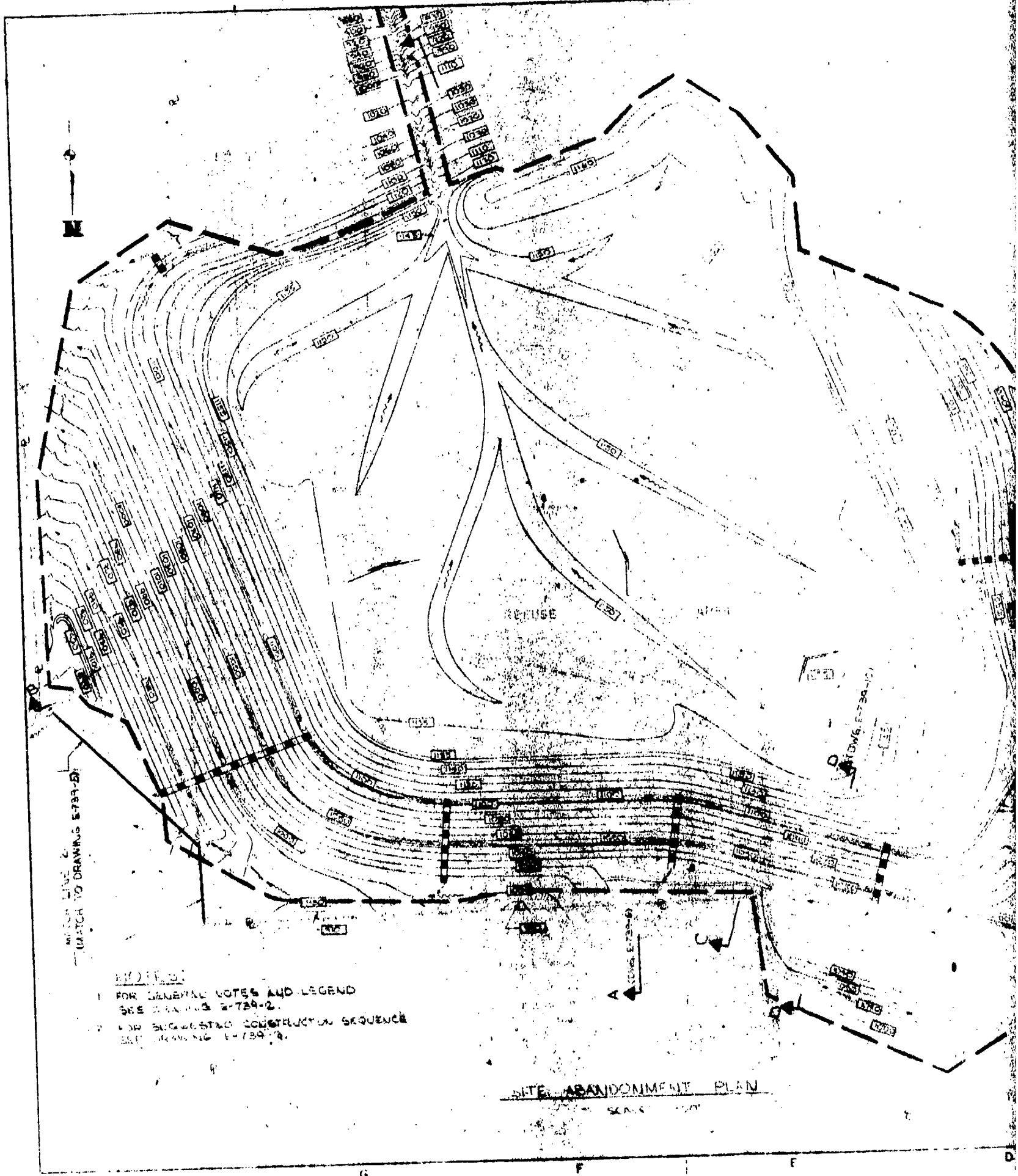
SCALE 1"=200'

H | G | F | E



SENT OUT
MAY 28 1981

PLATE IV


N
REFUSE
MATCH LINE C
MATCH TO DRAWING E-739-D
SEE DWG. E-739-C
SEE DWG. E-739-B
A
B
C
D
NOTES:
1. FOR GENERAL NOTES AND LEGEND SEE DRAWING E-739-2.
2. FOR SUGGESTED CONSTRUCTION SEQUENCE SEE DRAWING E-739-3.
SITE ABANDONMENT PLAN
H
G
F
E
D

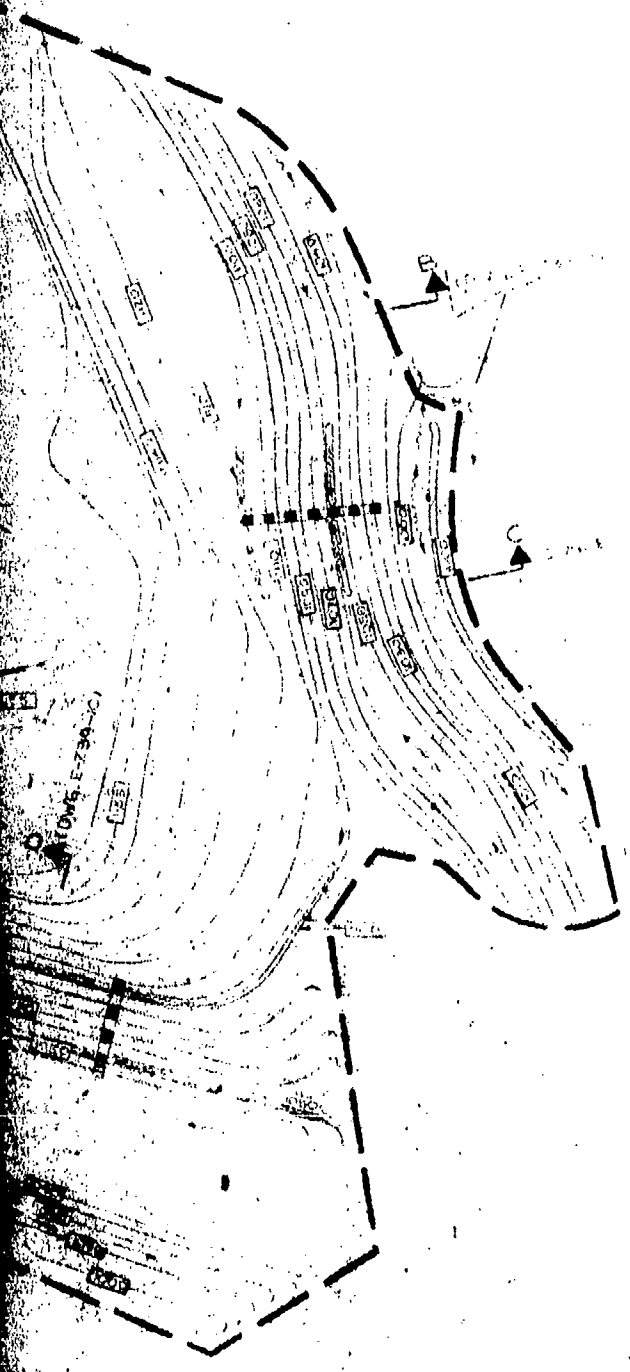
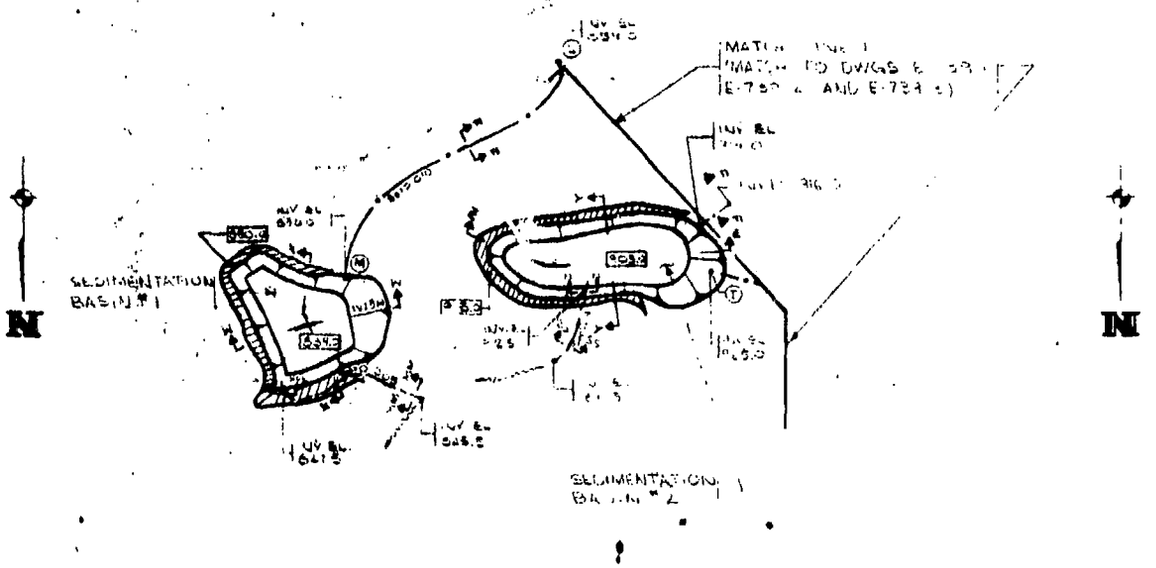
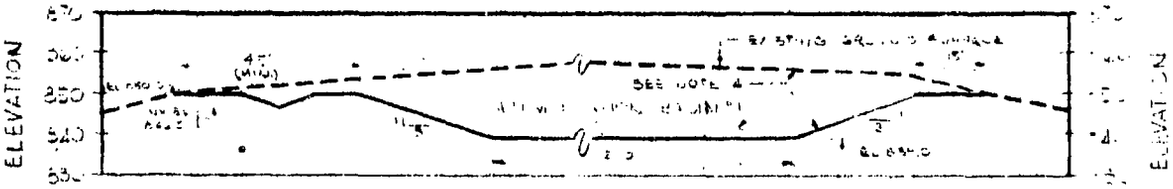


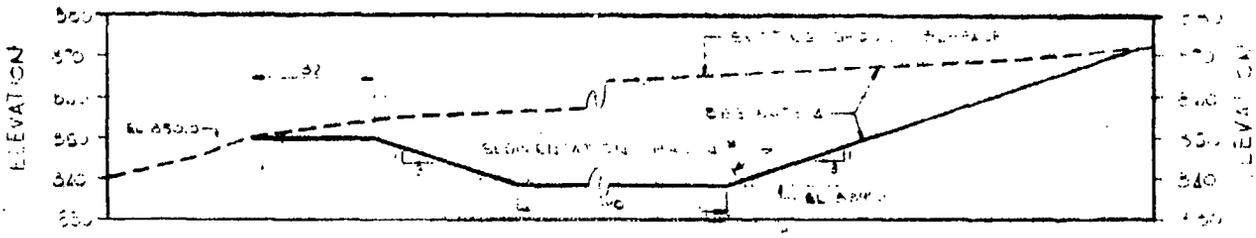
PLATE V



SEDIMENTATION BASINS #1 AND #2
STAGE 1 PLAN
STAGE 2 PLAN
STAGE 3 PLAN
SCALE



SECTION X-X
SCALE



SECTION W-W
SCALE

1. WORK AND GRADING WITH DRAWING E-734-1 THROUGH E-734-4 AND E-734-6 THROUGH E-734-9.
2. FOR SLOPES AND NOTES SEE DRAWING E-734-2
3. FOR SUGGESTED CONSTRUCTION SEQUENCE SEE DRAWING E-734-3
4. LIMITS OF STAGES 1 AND 2 CONSTRUCTION AS INDICATED.

H G F E

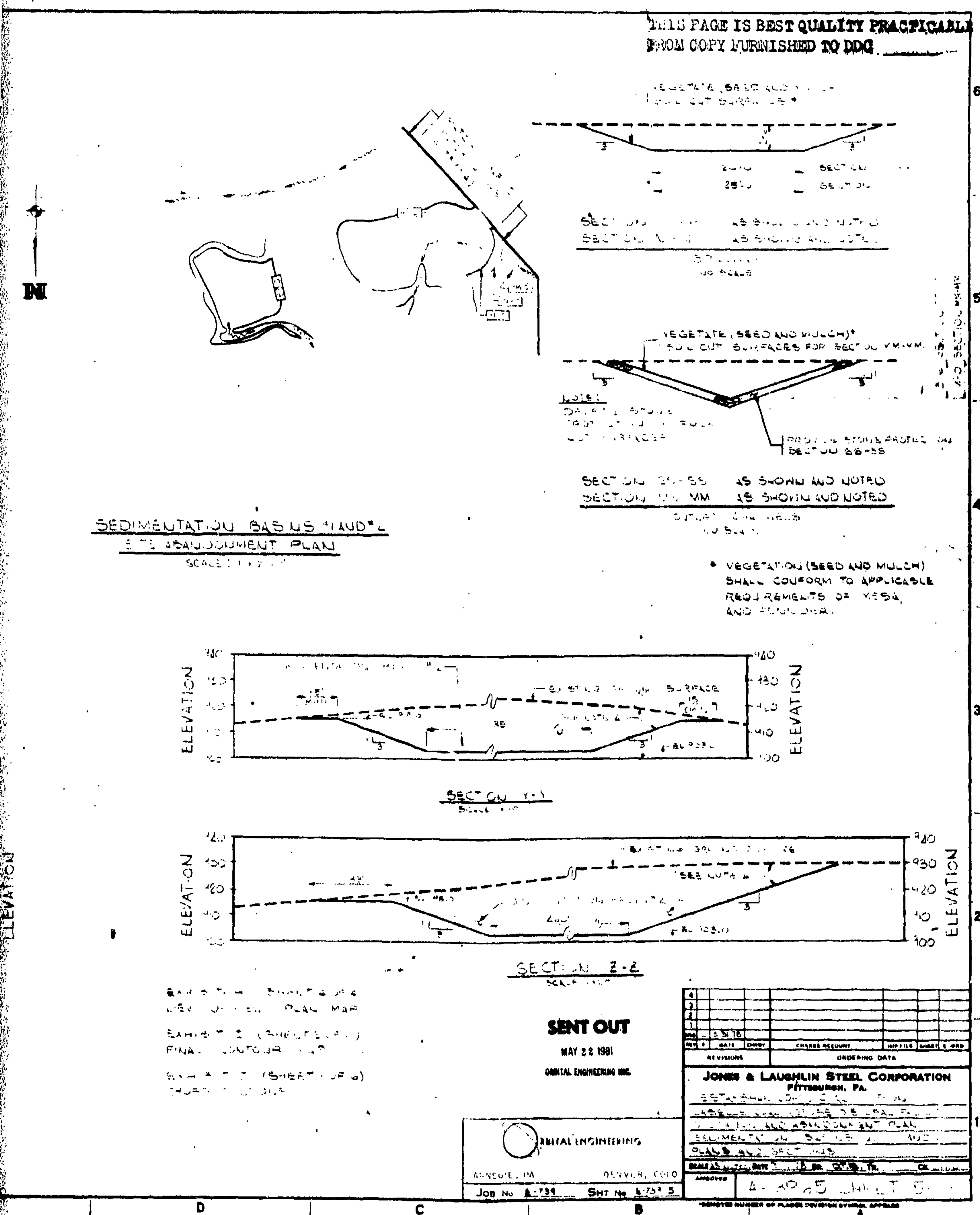
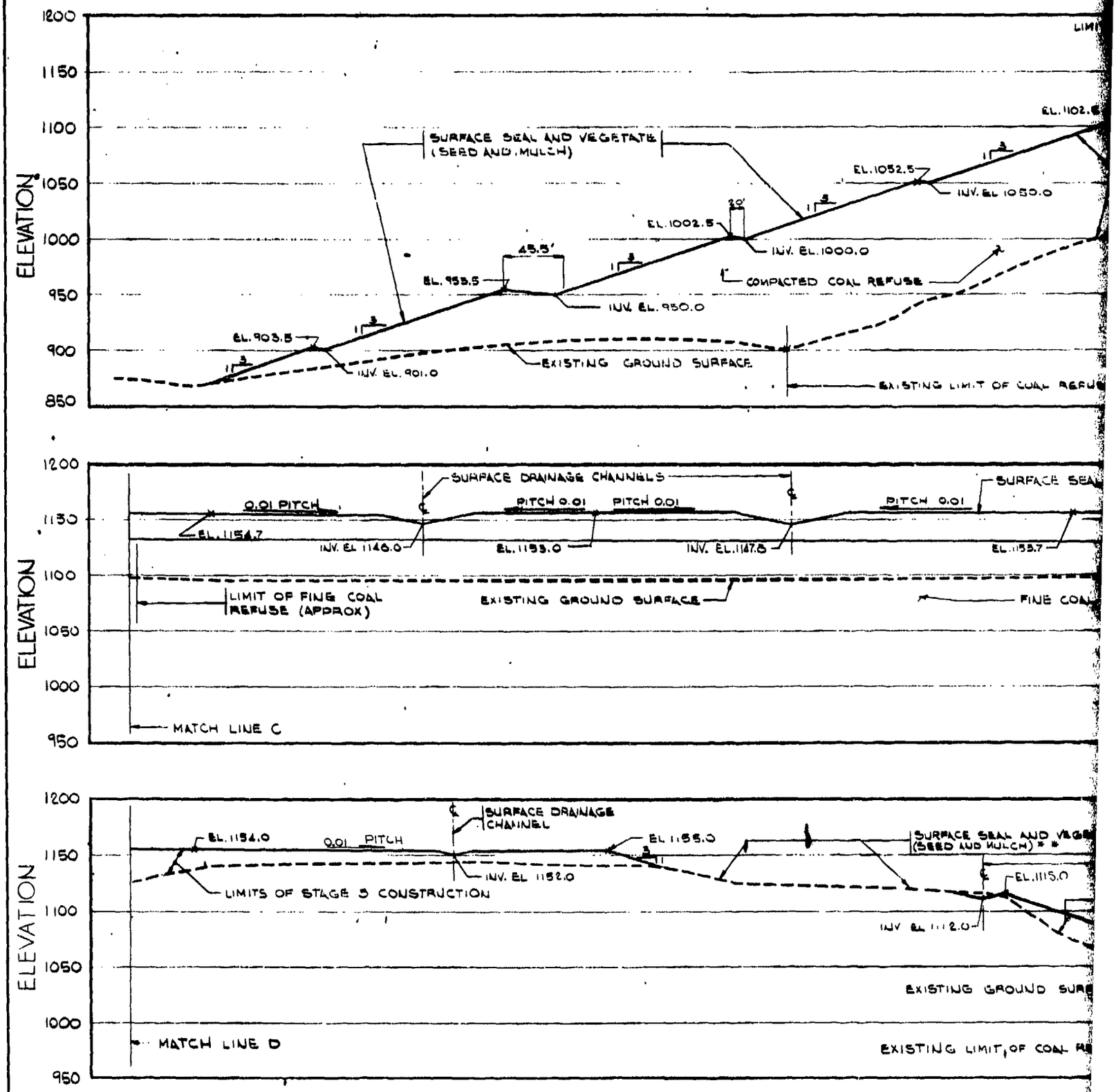


PLATE VI



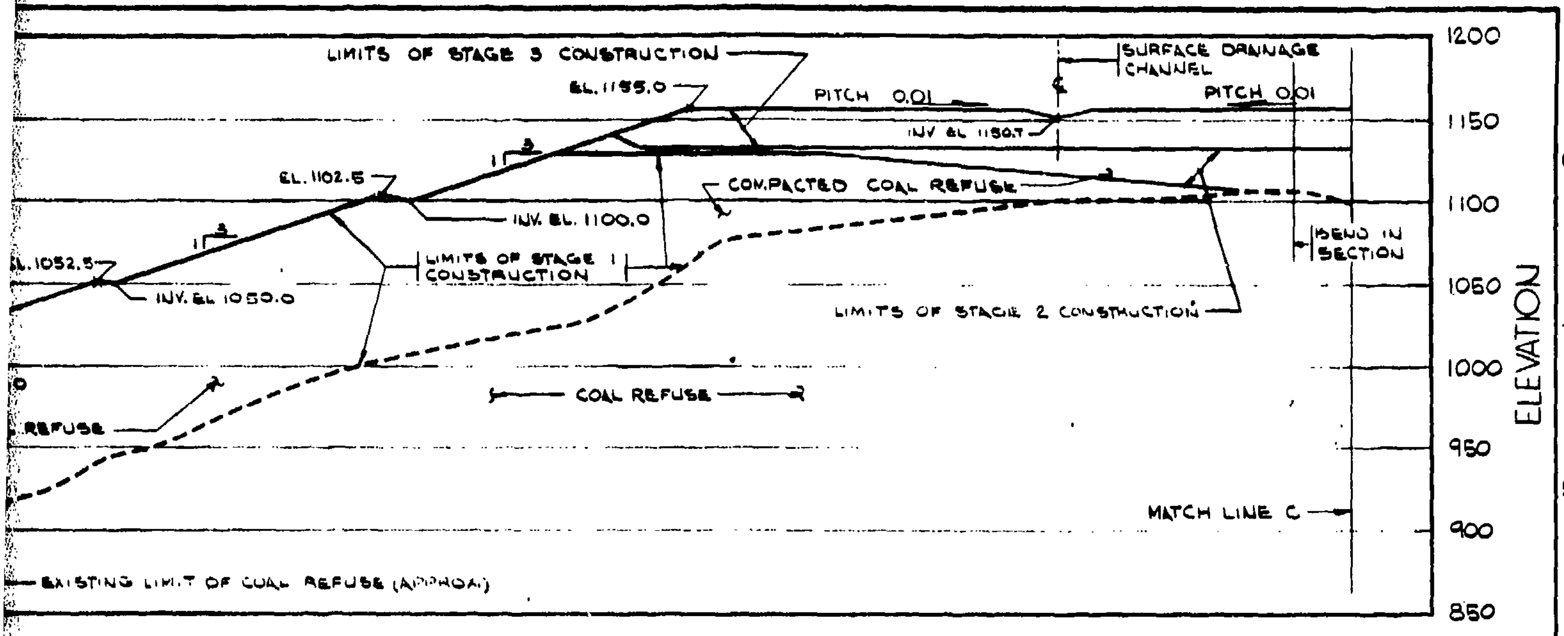
NOTES:

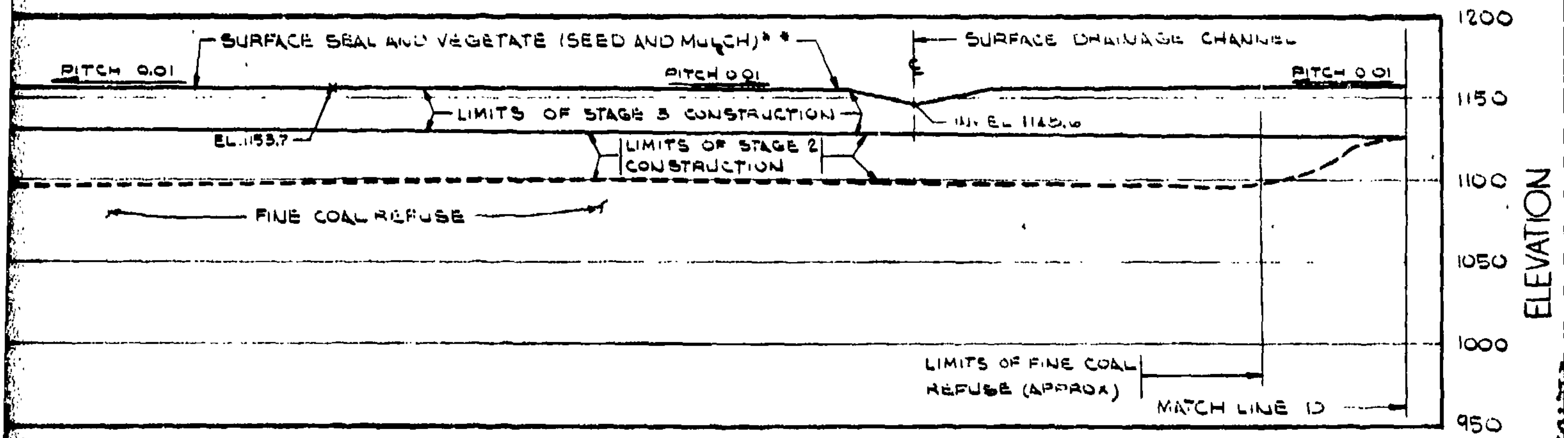
1. WORK THIS DRAWING WITH DRAWINGS E-739-1 THROUGH E-739-6 AND E-739-8 THROUGH E-734-10.
2. FOR SECTION LOCATION SEE DRAWINGS E-739-1, E-739-2 AND E-734-3.
3. FOR GENERAL NOTES AND LEGEND SEE DRAWING E-739-2.
4. FOR SUGGESTED CONSTRUCTION SEQUENCE SEE DWG E-739-3.

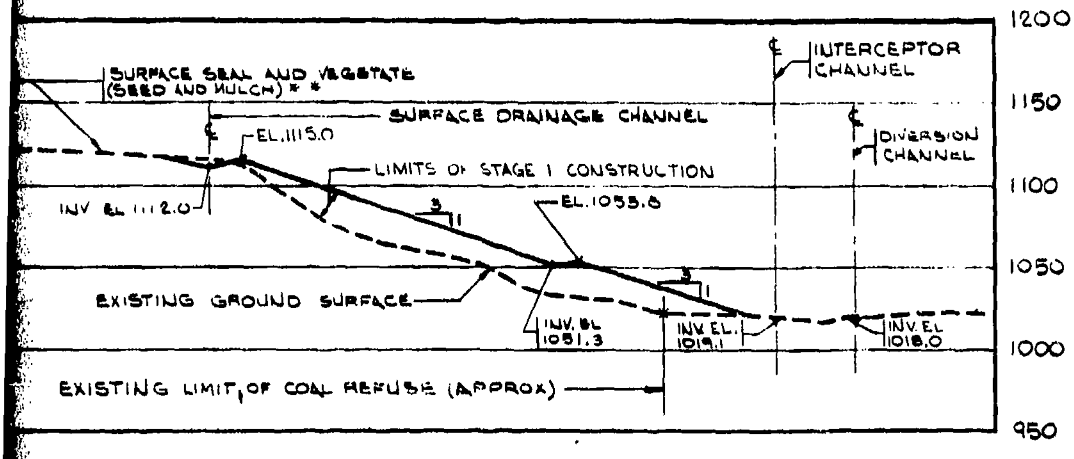
SECTION B-B

SCALE 1"=50'

H G F E







* * SURFACE SEAL AND VEGETATION (SEED AND MULCH) SHALL CONFORM TO APPLICABLE REQUIREMENTS OF MESA AND PENNDER.

EXHIBIT J
CROSS SECTIONS
(SHEET 3 OF 6)

B-B

SENT OUT
MAY 22 1981
ORBITAL ENGINEERING INC.

REV	DATE	CHK'BY	CHARGE ACCOUNT	INFILE	SHEET	E-ORD
4						
3						
2						
1						
–	3-31-78					

REVISIONS — ORDERING DATA

JONES & LAUGHLIN STEEL CORPORATION
PITTSBURGH, PA.
VESTA-SHANNOPIN COAL DIVISION
LABELLE COAL REFUSE DISPOSAL FACILITY
OPERATION AND ABANDONMENT PLAN
SECTION B-B

ORBITAL ENGINEERING
CARNEGIE, PA — DENVER, COLO.
JOB No. E-738 — SHT No. E-738-7

SCALE 1"=50' DATE 3-31-78 DR. D.T.S. TR. CK. L.W.C.
APPROVED
A-3965 SHEET 7/10

D | C | B | A

PLATE VII

1 2

APPENDIX F

GEOLOGY

GEOLOGY

Geomorphology

LaBelle Slurry Pond 3 is located within the Pittsburgh Plateau section of the Appalachian Physiographic Province. This area is characterized by gently folded sedimentary rocks which have been deeply cut by streams to form steep sided valleys. The dam is located at the head of a small tributary to the Monongahela River on a hilltop which has been covered with mine tailings. Hilltops in this vicinity lie between elevations 1100 feet and 1200 feet. Relief between the dam and the Monongahela normal pool level at the discharge of the unnamed tributary is about 300 feet.

Structure

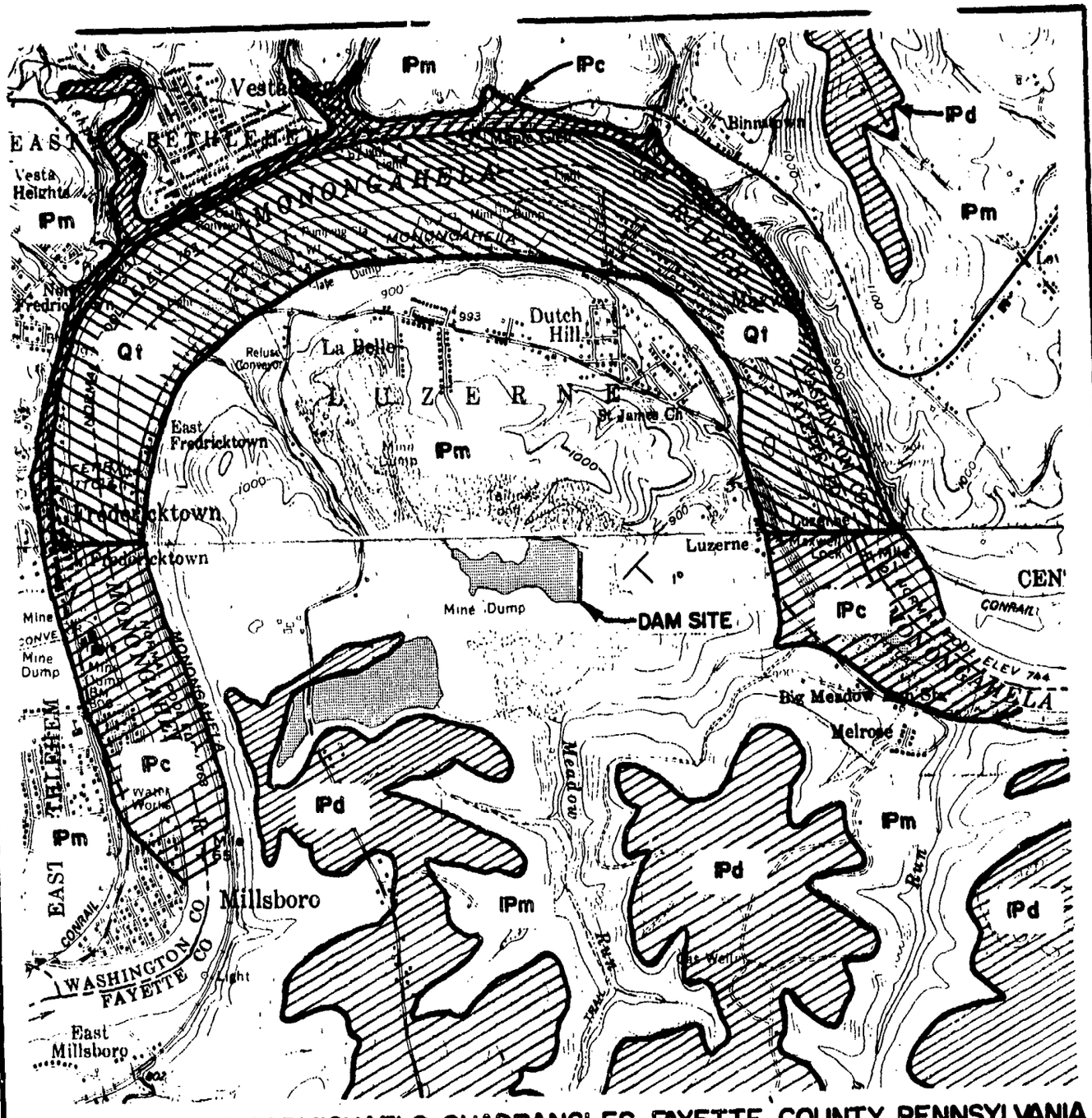
The site lies on the eastern flank of the Belle Vernon Anticline, a northeast-southwest trending structure which plunges to the southwest. Strata in the vicinity of the dam dip to the southeast at a rate of about 1 degree. No faults have been documented in the area of the dam and no observations were made that would indicate faulting in the rocks outcropping around the site.

Stratigraphy

Rocks outcropping in the area of the dam belong to the Conemaugh and Monongahela Formations of Pennsylvanian Age and the Dunkard Formation of Permian Age. These formations consist of cyclic sequences of shale, sandstone, limestone and coal. The underlying Pittsburgh Coal seam outcrops along the Monongahela River to the northeast and west of the site. The Waynesburg Coal, the base unit of the Dunkard Formation, outcrops in the hillsides adjacent to the site which are higher in elevation.

Mining Activity

The Pittsburgh Coal seam, the lower most unit of the Monongahela Formation, lies about 300 feet below the dam site. This coal is probably affected by deep mining at the location of the site.



CALIFORNIA and CARMICHAELS QUADRANGLES, FAYETTE COUNTY, PENNSYLVANIA

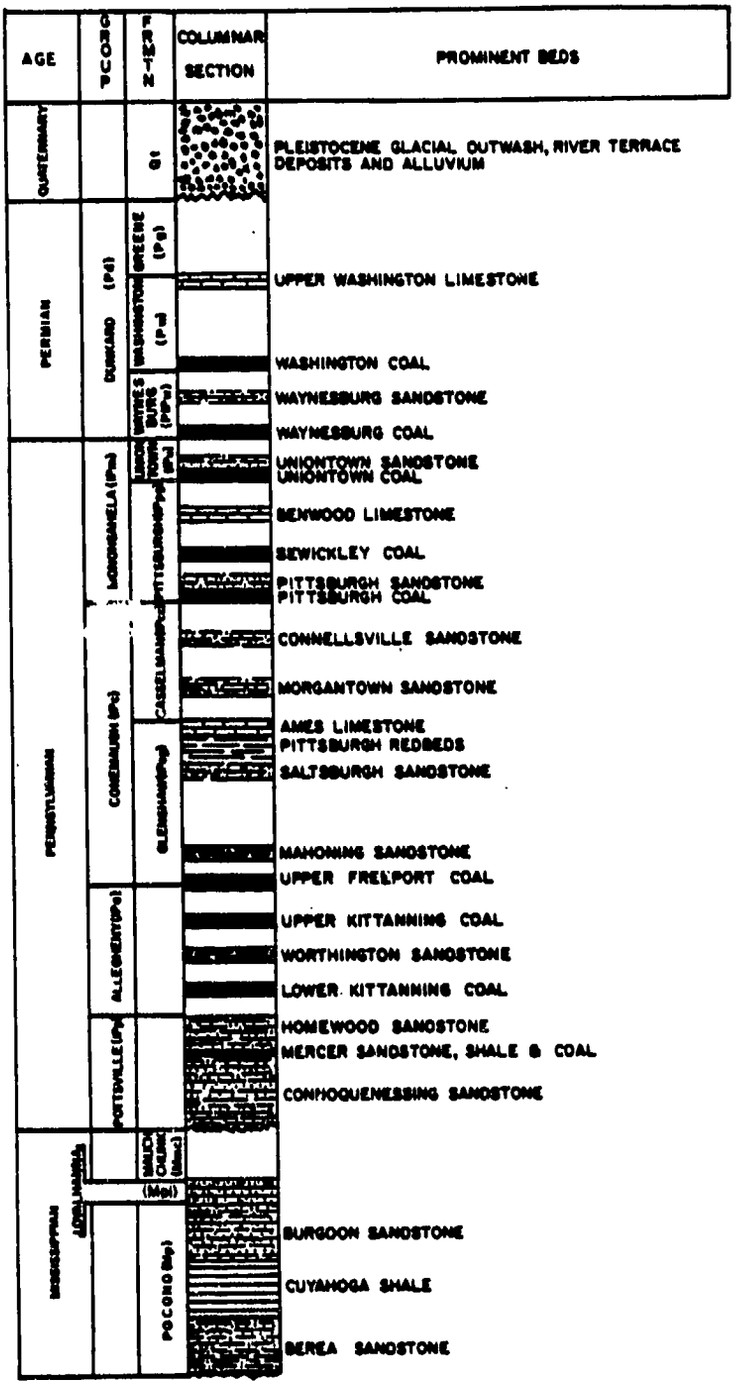
SCALE: 0 ½ MILE 1:24000

CONTOUR INTERVAL 20 FT. DATUM IS MEAN SEA LEVEL

——— FORMATION CONTACT

DATA OBTAINED FROM PENNSYLVANIA GEOLOGIC SURVEY, BULLETIN C26, GEOLOGY AND MINERAL RESOURCES OF FAYETTE COUNTY, PENNSYLVANIA, 1940 and UNITED STATES GEOLOGICAL SURVEY, GEOLOGIC ATLAS OF THE UNITED STATES, BROWNSVILLE-CONNELLSVILLE FOLIO, 1903 and PENNSYLVANIA TOPOGRAPHIC AND GEOLOGIC SURVEY GREATER PITTSBURGH REGION GEOLOGIC MAP AND CROSS SECTIONS, 1975.

DATE: JULY 1981	LABELLE SLURRY POND 3 NATIONAL DAM INSPECTION PROGRAM	GEOLOGIC MAP
SCALE: 1"=2000'		
DR: JF CK:	ACKENHEIL & ASSOCIATES CONSULTING ENGINEERS GEO SYSTEMS, INC. 1000 BANKSVILLE RD./PITTSBURGH, PA. 15216	



DATE: JULY 1981	LABELLE SLURRY POND 3 NATIONAL DAM INSPECTION PROGRAM	GEOLOGIC COLUMN
SCALE: 1" = 360'		
DR: JF CK:	ACKENHEIL & ASSOCIATES CONSULTING ENGINEERS GEO SYSTEMS, INC. 1000 BANKSVILLE RD./PITTSBURGH PA 15216	